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THE WATERHOUSE–FRIDERICHSEN SYNDROME*

Report of a Case With Recovery

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THE symptom complex known as the Waterhouse–Friderichsen syndrome was first described by Voelcker[1] in 1894. Early in 1944, Haas[2] found 144 cases reported in the literature, to which he added 3 of his own. Rucks and Hobson[3] stated that up to the beginning of 1942 there were 101 recorded cases, 26 of which had been reported in the preceding three years. Assuming that these workers did not overlook any cases up to the time of their respective communications, it appears that approximately 75 cases of the syndrome were reported between 1894 and 1939 and 75 in the five years from 1939 to 1943, inclusive. Since that time, Bernhard and Jordan[4] have reported 4 cases, Bush and Bailey[5] 6, and Meyer,[6] Martland[7] and Short and his associates[8] each 1, bringing the present total to 157. This suggests not so much an increased incidence as an increased interest in the disease and an improvement in methods for its recognition and treatment. Several excellent reviews and summaries have recently appeared,[2–5,9,10] but little has been said concerning the treatment, since the prognosis was hopeless prior to the advent of the sulfonamide drugs and potent adrenocortical preparations. Thus far, recovery has been reported in 11 patients.[5,11–16] Significant data, particularly in regard to treatment, from these cases and the one presented below are summarized in Table 1.

Of the 11 cases of Waterhouse–Friderichsen syndrome in which recovery has been reported, 3 were not described in sufficient detail to permit critical analysis,[13,15] but there seems to be little room for doubt about the diagnosis in any of them. Several features of special interest deserve to be emphasized.

Age Incidence

The Waterhouse–Friderichsen syndrome has been seen predominantly in children, Lindsay and his co-workers[17] noting that 90 per cent of the patients were under nine years of age. On the other hand, of those who have recovered to date, only 1 was under the age of nine. In this case, the skin lesions were apparently much severer and the toxemia greater than in the other 10 patients. The recent increase in cases reported may be due to the high incidence in Army camps. Although the age incidence is of somewhat less importance from a statistical viewpoint since the number of cases is so small, mere coincidence hardly accounts for recovery in 11 adults and in only 1 child. Significance may also attach to the fact that the child ran the stormiest course of all and developed the severest skin manifestations, with large necrotic lesions. This is compatible with the general principle that children react in a more labile fashion than do adults and exhibit much profounder reactions to identical stimuli. The present patient, sixty-three years of age, is the oldest on record with recovery, and the only one in whom a preceding hypertension was known to have existed.

Etiology

In the earlier reports, a meningococcemia was postulated as the causative factor of the disturbance. At present, the etiology of the condition is far from settled. The meningococcus was cultured from the blood stream of 6 of the 12 patients who survived, *Staphylococcus aureus* from 1, and a pneumococcus from 1. One patient had a negative blood culture. In 3 cases there was no record of a study of the blood for organisms, but 2 of these showed organisms in the spinal fluid (Table 1).

The pathologic changes may be explained anatomically.[3] The frequence with which the meningococcus has been recovered from blood and spinal fluid has supported the concept of an organismal ectodermal tropism, in which the skin, adrenal glands and brain are simultaneously involved.[18] Cerebral changes have been demonstrated histologically.[19]

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Morbidity

The rapidity with which reports have been appearing in the recent literature suggests that the Waterhouse–Friderichsen syndrome occurs much more frequently than was formerly thought. The average incidence in the last 485 cases of meningitis reported from Army camps [4–6,20] was 3.3 per cent; it occurred in 4 of 182 patients,[4] 5 of 134,[20] 6 of 126,[5] and 1 of 43.[6]

Treatment

Sulfonamides were used in the treatment of each of the 12 cases (Table 1). Sulfanilamide was administered in 1, beginning forty-eight hours after onset. In this case, the quantities given were small until the seventh day; antimeningococcus serum was injected shortly after onset and was continued with apparently good effect.[11] Sulfathiazole was used in 2 cases,[3,12] sulfapyridine in 1,[14] and sulfadiazine in the remaining 8. Although the azotemia and the abnormal urinary findings appear to contraindicate the use of sulfonamides, in no case has a renal complication been described. Moreover, the ready availability of these compounds and the severity of the condition under consideration amply justify their use either separately or in conjunction with antimeningococcus or other immune serums.

Antimeningococcus serum was employed for 3 patients, who appear to have responded no more rapidly than those in whom sulfonamides were used alone.

Watery extracts of the adrenal cortex were given in 10 cases. Desoxycorticosterone acetate alone was used in 2 patients,[15] and in conjunction with watery extracts in 3 cases,[5,12] as well as in the case reported below. The administration was unavoidably delayed for as long as thirty-six hours in 1 patient,[3] despite which the authors believe that it played an important role in maintaining the equilibrium between the tissues and the circulation, was definitely responsible for the stabilization of the blood pressure, and stimulated carbohydrate metabolism. It appears to have aided materially in terminating the stupor. The dosages of cortical hormone have not been large, in 1 case only 20 cc. of the watery extract being given during the second day after the fulminant symptoms began.[16] Another patient was given 10 cc. nine and twenty hours respectively after the acute onset, followed by 10 mg. of desoxycorticosterone acetate at the thirtieth hour and daily thereafter for five days.[17] One case received 50 cc. of watery extract within the first twenty-four hours and none thereafter.[11] This had a striking beneficial effect on the blood pressure and mental status before either sulfonamides or antimeningococcic serums were employed. Sharkey[14] gave a total of 70 cc. of watery extract in four days, after which time his patient was out of danger. The largest doses of hormone were given by McCarty and Infield,[15] who used desoxycorticosterone acetate exclusively, administering 10 mg. every two hours until a systolic blood pressure of over 100 was obtained. Unfortunately, neither of their cases is

TABLE 1. *Summary of Data in all Recovered Cases.*

Source	Age	Sex	Blood Culture	Blood Pressure on Admission mm.Hg.	Adrenocortical Therapy: Interval after onset hr.	Adrenocortical Therapy: Repeat interval hr.	Adrenocortical Therapy: Initial dose*	Adrenocortical Therapy: Total dose*	Sulfonamide and Specific Therapy: Preparation	Sulfonamide and Specific Therapy: Interval after onset hr.	Sulfonamide and Specific Therapy: Initial dose	Sulfonamide and Specific Therapy: Total dose	Other Therapy
Carey[11]	27	F	Meningococcus	65/35	16	4–5	10 cc.	50 cc.	Sulfanilamide Mgc. antiserum	48 24	5.5 gm. ?	50 gm. 170+cc.	Epinephrine (1:1000); 1 cc.
Grace, Harrison and Davie[13]	40	F	?	Low	?	?	?	?	A sulfonamide	?	?	?	
Bickel[12]	24	F	Pneumococcus	80/50	9 30	10–12 24	10 cc. 10 mg.	20 cc. 50 mg.	Sulfathiazole	9	2.0 gm.	37 gm.	Camphor in oil 2 cc.; epinephrine (1:1000), 1 cc.; Coramine, 2 cc.; Ephetonine, 1 cc.
Sharkey[14]	40	F	Sterile§	65/?	15	2	10 cc.	70 cc.	Sulfapyridine	15	3.0 gm.	36 gm.	
Rucks and Hobson[3]	3	M	*Staph. aureus*	Too low to obtain	36	4–6	5 cc.	90 cc.	Sulfathiazole	36	0.6 gm.	8 gm.	Epinephrine (1:1000), 0.2 cc.; vitamin K.
McCarty and Infield[15]†	?	M	Meningococcus	Low	?	2	10 mg.	?	Sulfadiazine Mgc. antitoxin	? ?	4.0 gm. 50,000 units	? ?	
Peabody[18]	19	F	Meningococcus	60/40	?	?	20 cc.	40 cc.	Sulfadiazine	?	5.0 gm.	?	
Bush and Bailey[8]‡	?	M	Sterile	80/60	?	4	10 mg. 20 cc.	80 mg. 75 cc.	Sulfadiazine Mgc. antitoxin	? ?	5.0 gm. 20,000 units	? ?	
Meyer[6]	23	M	Meningococcus	70/45	?	?	?	?	Sulfadiazine Mgc. antiserum	0 ?	5.0 gm. ?	? ?	
Weinberg and McGavack	63	F	Meningococcus	100/50	3	3 3–12	10 mg. 10 cc.	20 mg. 70 cc.	Sulfadiazine	5	7.5 gm.	64.5 gm.	Coramine, 2 cc.; vitamins C and K.

*Doses in cubic centimeters represent the watery extract, and those in milligrams, desoxycorticosterone acetate.
†Two cases of recovery mentioned but not described in detail.
‡Two cases of recovery mentioned but only one described in detail.
§Patient's serum subsequently gave a positive complement-fixation test with meningococci.

described in detail. Although desoxycorticosterone acetate is not a complete substitute for cortical deficiency, its ready availability and its profound effect on the blood pressure and the distribution of electrolytes warrant its routine use in all suspected cases of the Waterhouse–Friderichsen syndrome. In careful reading of the reports of the cases of patients who recovered, one gains the impression that a major portion of the early improvement in Epinephrine was used with little recorded effect. Camphor and Coramine served as stimulants during the cyanotic phase of collapse in most of the patients, but their real value should be questioned.

Laboratory Findings

Values for sodium and potassium were normal in 2 of the patients in whom determinations were

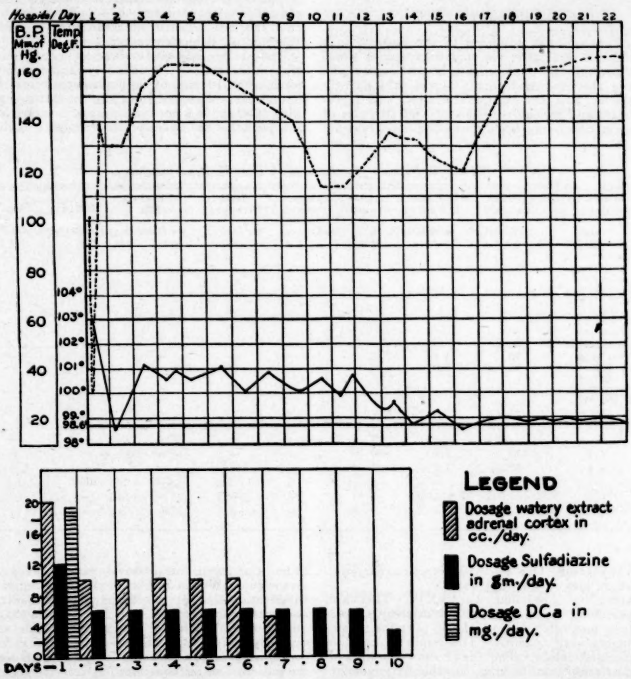

FIGURE 1.

mental status must be attributed to the hormonal therapy used.

The importance of cortical hormone in the treatment is still further emphasized by Haas's[2] description of his third case, which received adequate sulfonamide therapy but no hormone. The patient's condition grew steadily worse, with increasing stupor and death, nine hours after hospitalization and twenty hours after the onset of fulminant symptoms.

All the patients who recovered received liberal supportive treatment, chiefly in the form of intravenously administered glucose and saline solutions.

made,[11,12] as well as in our case, but a low sodium value was noted in Bush and Bailey's[5] patient; the chloride was extremely low (216 mg. per 100 cc.) initially in the case reported by Meyer,[6] to rise after recovery to 472 mg. Peabody's[16] patient had a normal chloride on admission. In such an acute condition, marked changes are more surprising than normal values since one would hardly expect to find variation in the electrolytes until there had been some depletion of readily available stores in interstitial fluid chambers. Even in patients with Addison's disease, Wilder and his associates[21] have demonstrated that the serum levels for these sub-

stances may be normal despite profound alterations in their behavior.

Histologic changes in the liver have been described in 2 cases of purpura fulminans in which the patients lived for eighty and eighty-eight hours, respectively.[20] In both patients, death was ascribed to hepatorenal failure. The case reported here is apparently the only one in which an attempt was made to appraise liver function during life.

Case Report

A 63-year-old woman was admitted to the hospital in a deep stupor within 1 hour after she had collapsed at work. She had had a sore throat 3 days prior to hospitalization and a mild headache the evening before. It was subsequently revealed that she had had mild exertional dyspnea and hypertension for 5 years and an equivocal history for 20 years of pernicious anemia, which had been controlled by occasional injections of liver extract. One son had pernicious anemia; otherwise the family history was irrelevant.

The temperature on admission was 102°F. The skin showed many petechiae, especially over the extremities and head, and a diffuse, purpuric eruption, chiefly over the trunk. The lips and fingers were cyanotic. The pupils reacted to light and in accommodation. The fundi showed minimal papilledema and arteriovenous nicking. Otorhinolaryngologic examination revealed many mucosal petechiae. The neck was rigid. A few fine, moist rales were heard at the base of each lung. The heart sounds were distant and of poor quality, but the aortic second sound was accentuated. There was a systolic aortic murmur with maximal intensity over Erb's point, transmitted downward toward the apex. The blood pressure was 100/50 and the pulse 120, with a sinus rhythm. The deep-tendon reflexes were hypoactive throughout. Brudzinski's sign was present, Babinski's reflex was equivocal, and Kernig's reaction was absent.

A spinal tap showed an initial pressure equivalent to 300 mm. of water, with free pulsation. The fluid was densely cloudy and showed innumerable polymorphonuclear cells and a ++++ test for globulin. The sugar level was 15 mg. per 100 cc., the protein 880 mg., and chloride 670 mg. The sedimentation rate of the red cells was 45 and 110 mm. in 15 and 60 minutes, respectively. The blood chemical constituents were as follows: nonprotein nitrogen, 62.5 mg. per 100 cc.; creatinine, 2.5 mg.; glucose, 200 mg.; chloride, 94.2 milliequiv. per liter; sodium, 141.7 milliequiv.; potassium, 5.3 milliequiv.; total cholesterol, 122 mg. per 100 cc.; and cholesterol esters, 56 mg. Mild albuminuria was the only urinary abnormality. A blood Wassermann reaction was negative, but a Kahn reaction was ++++. The white-cell count was 30,200, with 90 per cent neutrophils, of which 30 per cent were immature. The red-cell count was 3,700,000, with 78 per cent hemoglobin and a color index of 1.05. No organisms were found in direct smears of the spinal fluid. Stained smears from petechiae showed gram-negative biscuit-shaped diplococci, and cultures from the blood, spinal fluid, and petechiae yielded meningococci. The icteric index, the van den Bergh reaction and the blood phosphorus and phosphatase were all within normal limits; the cephalin flocculation reaction was ++++.

The history of acute onset with collapse, the purpura, the hypotension (100/50) despite fundoscopic evidence of hypertension, the cyanosis and the septicemia led to the conclusion that the case was one of acute adrenal insufficiency of the Waterhouse–Friderichsen type.

The patient was given 10 cc. of watery adrenocortical extract intravenously immediately, and two intramuscular injections of 10 mg. of desoxycorticosterone acetate each, 3 hours apart. A second 10-cc. dose of cortical extract was given with 1000 cc. of 5 per cent glucose in saline solution. Within the 1st hour, the blood pressure became unobtainable; Cora-

Table 2. *Summary of Laboratory Data in Reported Cases.*

Date	White-Cell Count	Neutrophils	Red-Cell Count	Hemoglobin	Nonprotein Nitrogen	Urea Nitrogen	Creatinine	Sugar	Sodium	Potassium
	×10³	%	×10⁶	%	mg./100 cc.	mg./100 cc.	mg./100 cc.	mg./100 cc.	meq./l.	meq./l.
2/25	30.2	96	3.7	78	62.5	—	2.5	200	141.7	5.3
2/28	—	—	—	—	32.0	—	1.3	98	143.0	5.0
2/29	14.0	90	3.8	80	—	—	—	—	—	—
3/1	13.6	88	3.9	80	—	—	—	—	—	—
3/6	—	—	—	—	—	—	—	—	—	—
3/8	7.3	70	3.6	80	—	—	—	—	—	—
3/12	6.4	70	3.7	80	—	—	—	—	—	—
3/16	—	—	—	—	—	11.5	1.0	105	143.5	3.3
3/22	—	—	—	—	—	—	—	—	—	—
3/26	—	—	—	—	—	—	—	—	—	—

mine was given intravenously and oxygen administration was begun. Within 5 hours of the initiation of adrenocortical substitution therapy, the blood pressure had risen to 140/60 and remained near that level for the balance of the first 24-hour period. The initial dose of sulfadiazine was given intravenously by infusion at the rate of 7.5 gm. in 5 hours and was continued intravenously at the rate of 1 gm. in 4 hours until the patient became conscious.

During the 1st night, the patient was extremely restless, confused and sufficiently irrational to require restraint. By the next morning (approximately 12 hours after admission), she was lucid and able to take medication orally. Thereafter, she was given sulfadiazine by mouth at the rate of 1 gm. every 4 hours with large doses of bicarbonate of soda. Vitamins K and C were given parenterally in large doses to reduce the purpuric diathesis and to diminish the chances for acute vitamin C deprivation through adrenal damage. The patient was started on digitalis therapy, not because there was evidence of cardiac decompensation but rather as a precautionary measure in a toxic patient past the age of 60.

After the first day, 5 cc. of cortical extract was given twice daily for 1 week. Vitamins K and C were continued throughout the hospital stay. The sulfadiazine, for which a blood level of 9 mg. per 100 cc. had been established, was continued orally for 10 days at the rate of 1 gm. every 4 hours. The temperature (Fig. 1) dropped to normal in 24 hours, but rose again the following day to 101.2°F., from which level it gradually fell to normal in 14 days. (It is interesting to note that the fall in temperature followed the discontinuation of sulfonamide therapy and that, although the cyanosis and

purpura subsided relatively rapidly, small furuncles appeared over the lower extremities in petechial areas despite the sulfonamide treatment.)

The blood pressure throughout the 1st week was maintained around 160/90 and during the 2nd week around 140/60, with one drop to 115/45, which occurred 3 days after the cessation of adrenal substitution therapy. For 3 more days, it fluctuated between 115/45 and 135/70, but then resumed its previous amplitude at around 160/90.

Throughout the course of the disease, the urine was negative except for traces of albumin. Within 2 weeks, the sedimentation rate of the red cells was 5 and 30 mm. in 15 and 60 minutes, respectively. Wassermann tests were repeatedly negative, but the Kahn reaction was successively ++++, ++, ++++, ++++, ++++ and +++. There was a gradual diminution in the white-cell count to 7000, with a normal distribution of the various types of cells. The red-cell counts were repeatedly between 3,600,000 and 3,900,000, and the hemoglobin between 78 and 83 per cent. Four days after admission, the nonprotein nitrogen had dropped from 62.5 to 32.0 mg. per 100 cc., and remained normal thereafter. The blood creatinine and blood sugar were not pathologically altered on any of a number of serial examinations. The

The finding of relatively normal serum sodium, potassium and chloride levels is not astonishing in view of the work of Loeb, Atchley, Benedict and Leland,[22] who observed that even when total adrenalectomy was performed in animals the daily rate of the reduction in sodium was as little as 2.3 milliequiv. per liter. Other workers have noted that alterations in electrolyte levels may be relatively small, even in cases in which there is definite Addison's disease.[21] This patient showed the marked elevations in nonprotein nitrogen and creatinine that are generally manifest in Addison's disease during crisis. Since dehydration was not present, this finding emphasizes the close functional connection between the kidney and the adrenal cortex.

The ++++ cephalin flocculation test indicated an active process in the parenchyma of the liver.

TABLE 2 (*Continued*).

DATE	CHLORIDE	PHOSPHORUS	CHOLESTEROL TOTAL	CHOLESTEROL ESTERS	ICTERIC INDEX	VAN DEN BERGH REACTION	CEPH. FLOC. TEST	PHOSPHATASE	PROTEIN	A-G RATIO	SPINAL FLUID
	meq./l.	*mg./100 cc.*	*mg./100 cc.*	%				*B.u./100 cc.*	*gm./100 cc.*		
2/25	90.2	3.3	122	46	5.0	0	++++	4.0	6.0	2.0	Cloudy (many polymorphonuclears); pressure, 300 mm.; globulin, ++++; protein, 880 mg. per 100 cc.; chloride, 670 mg. per 100 cc.; culture, positive for meningococci.
2/28	96.8	—	—	—	—	—	—	—	—	—	Slightly cloudy (318 cells per cu. mm.); pressure, normal; globulin, +++; chloride, 688 mg. per 100 cc.; culture, sterile.
2/29	—	—	—	—	—	—	—	—	—	—	
3/1	—	—	—	—	—	—	—	—	—	—	
3/6	—	3.2	206	70	11.0	Delayed	+	3.8	5.0	1.5	
3/8	—	—	—	—	—	—	—	—	—	—	
3/12	—	—	—	—	—	—	—	—	—	—	
3/16	102.0	3.7	170	62	5.2	0	++++	5.7	7.0	2.6	
3/22	—	3.5	210	52	6.0	0	0	4.1	7.0	3.2	
3/26	—	3.5	206	75	5.5	0	+	3.0	7.0	1.3	

fasting blood sugar and the levels obtained at half-hourly intervals after the ingestion of 100 gm. of glucose were respectively 105, 180, 185, 190 and 145 mg. The basal metabolic rates on two occasions were −7 and −4 per cent. The spinal fluid showed a gradually complete recession in the inflammatory process. The icteric index rose to 11 the second week, and the van den Bergh reaction was simultaneously delayed; thereafter, the former was normal and the latter negative. The cephalin flocculation response decreased from ++++ to negative in 4 weeks. The total blood cholesterol increased from an initial value of 122 mg. per 100 cc. with 45 per cent esters to 210 mg. with 75 per cent esters. The serum protein, chloride, potassium and sodium were within normal limits in each of four determinations (Table 2).

DISCUSSION

Hyperglycemia was an unexpected finding in this case. It had been previously observed, however, in an acute hemorrhagic adrenalitis that was proved post mortem.[22] The normal values subsequently obtained and the normal glucose tolerance noted after recovery from the acute episode in this case suggest that a trigger mechanism released adrenalinlike substances during the collapse of the organism, which secondarily elevated the blood sugar.

This was confirmed by the low total cholesterol, a diminution in the percentage of esters and an elevation of the icteric index. Later all these values returned to normal, suggesting the transient nature of the disturbance and the close relation between hepatic, renal and adrenal activity. It is, of course, possible that the icteric index rose as a result of ecchymotic and petechial hemorrhages.

The acute onset of the disease, associated with collapse, the rapid development of the cyanosis, the petechiae and the purpura, and the hypotension, the hypotonia and the hyporeflexia all indicated an acute adrenal insufficiency of the Waterhouse–Friderichsen type. The early and vigorous institution of therapy was responsible for sustaining the patient during the stage of onslaught with depressed or absent adrenocortical activity. Whether adrenal hemorrhage, simple edema or edema with petechial hemorrhages occurred, it is impossible to say. In any event, without therapy the prognosis would have been hopeless.

In view of the present high frequency of meningitis and the surprisingly high percentage of cases developing the Waterhouse–Friderichsen syndrome, it is important that the disease be borne in mind whenever a sudden state of collapse with purpura occurs in meningitis or following a simple sore throat. That 12 cases have recovered under appropriate therapy emphasizes the necessity for early diagnosis and treatment.

Suggested Therapeutic Routine

The pathogenesis of the Waterhouse–Friderichsen syndrome and the rather uniform clinical course of the untreated cases afford an unusual opportunity to standardize the therapeutic regime. Certain conditions may be specifically met:

The pulselessness, cyanosis and state of collapse may warrant the use of Coramine, epinephrine or caffeine sodium benzoate, the values of which are probably in the order named. Dosages should be large and should be repeated on indication, although this is usually unnecessary. Such therapy is in no way fundamental, and there are those who doubt its usefulness, but it is believed that in the case reported such emergency treatment was of supportive value while other therapy was being arranged.

The first treatment for the insufficiency of the adrenal cortex should be 20 cc. of water extract, administered intravenously in 500 cc. of 2 per cent sodium chloride solution containing 5 per cent glucose. At least two and a half hours should be allowed for this infusion. As soon as it is well started, 15 mg. of desoxycorticosterone acetate should be given subcutaneously or intramuscularly; 10 mg. should be injected thereafter every eight hours until the systolic blood pressure is persistently above 100. After that, 10 mg. may be given daily until convalescence is well established, with normal temperature, pulse and blood pressure.

The associated infectious process should have vigorous treatment from the start. If the pneumococcus is the offending organism, it is well to begin treatment with penicillin, if available. An initial dose of 15,000 to 20,000 units intrathecally should be followed by 20,000 to 40,000 units intramuscularly every three hours. In the severer cases, the intravenous route may be employed, preferably by the continuous-drip method. It still seems wise, however, to avoid this route whenever possible, since there is some likelihood of producing a further febrile reaction or a thrombophlebitis. If the usually found meningococcus or any other bacterium except the pneumococcus is present, sulfonamide therapy should be vigorously followed. Sulfadiazine seems to be the agent of choice, since it probably penetrates the spinal canal more readily than do any of the others. An initial dose of 3 gm. of the sodium salt should be given intravenously as a 5 per cent or weaker solution. In any event, not less than half an hour should be required for its administration. Subsequently, 2 gm. should be used every four hours until oral administration is possible, when the dose should be reduced to 1 gm. every four hours. Sulfonamide treatment is not contraindicated by the azotemia present in these cases. Should this treatment fail, penicillin as above described should be tried without delay.

In support of the activity of the adrenal cortex, it is possible that vitamin C has specific value. One of the crystalline preparations for intravenous use should be employed during the period of stupor. Renal loss is decreased by using several small doses instead of a single large one. The total for the day varies in individual cases from 100 to 500 mg., and can be conveniently administered along with the necessary infusions. If the bleeding tendency is great, there is at times a lowered percentage of prothrombin. Whether or not this occurs, vitamin K or a vitamin K-active substance, such as 2-methyl-1,4-naphthoquinone, may be given empirically. The latter is water soluble and may be administered intramuscularly in doses of 1 to 2 mg. daily.

Summary

Recovery from the Waterhouse–Friderichsen syndrome is recorded in the case of a sixty-three-year-old woman with a past history of hypertension. Treatment included sulfadiazine and adrenocortical hormone.

Eleven previously reported recovered cases are briefly summarized, particularly in relation to the therapy received.

The improved prognostic outlook for patients with the Waterhouse–Friderichsen syndrome is stressed.

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CASUALTIES IN THE SOUTH PACIFIC

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TWENTY months' duty in the Southwest Pacific gave me the opportunity to see and participate in the care of many war wounded. The first fourteen months were passed in New Zealand, following which a transfer northward brought my unit close enough to the Solomon Islands campaign to receive battle casualties from there by air.

Duty in New Zealand was very pleasant. The country is roughly a thousand miles long and one to two hundred miles wide. It is made up of two large islands, with a narrow strait between. The total population is only 1,600,000. The climate is delightful. It is much like New England, except that summers are cooler and winters are warmer. At the location of the hospital, the average summer temperature was only 15° warmer than the average winter temperature. During the entire year there was only one light flurry of snow, but there were occasional frosts during the winter months of July and August. Fishing and hunting were excellent, but we were too busy to get much time for outings.

The New Zealanders were incredibly hospitable to the Americans. On several occasions, large parties of hospital patients were invited to spend a week or more on convalescent leave at various New Zealand towns. At these towns, we were most hospitably entertained as guests by the New Zealanders in their private homes. With plenty of beefsteak, butter and cream, the patients often gained several pounds during these periods.

In New Zealand, I was first assigned to several weeks of temporary duty with a hospital unit other than my own. This unit had been given for its grounds a large soccer field on the edge of a town. Starting from an empty, level green field, an excellent modern hospital was built and equipped in the short period of four and a half weeks. All the buildings and equipment had been brought from the United States. The buildings were of prefabricated steel and were admirably suited for use in hospital construction. Under the supervision of a Navy civil engineer, the work was rushed to completion by the hospital personnel. During the last few days before completion of the buildings, work was remarkably rapid. I particularly recall supervising the laying of a floor in one of the storehouses the day the patients arrived. After we had started laying floor boards from one end of the building, trucks began to unload supplies onto the floor sections we had completed, before we were halfway down the length of the building. The equipment and supplies were plentiful and of the very best quality.

On the thirty-first day after breaking ground, casualties were received from the cruiser battle that took place off Guadalcanal in early August, 1942. As you will remember, four heavy cruisers were sunk — the *Quincy*, *Vincennes* and *Astoria* and the Australian cruiser *Canberra*.

On August 20, 1942, we received from a United States hospital ship 366 patients, almost all of whom had been wounded in the Solomon Islands engagement of August 7 to 9. Only one patient had died during the week aboard the hospital ship, and only one died at the New Zealand hospital. It was obvious that these men had had excellent care. Dressings appeared clean and neat; plaster casts had been carefully applied to the many fracture cases; even the sickest patients appeared well nourished and not suffering from dehydration. No patient seemed to need immediate surgery. There were many severely wounded patients in the group. Lieutenant George Crile, Jr., of Cleveland, Ohio, published an excellent article on this subject in the March, 1943, issue of the *United States Naval Medical Bulletin*. It was entitled "Experiences of the Surgical Service of the United States Naval Hospital, Auckland, New Zealand, with Casualties from the Initial Solomon Islands Engagement." To give some idea of the relative numbers of various types of injuries among these 366 casualties, Crile's figures are useful. There

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were 114 flesh wounds, 104 compound fractures and 40 second-degree and third-degree burns. There were 11 surgical or traumatic amputations.

The flesh wounds had been treated with sulfanilamide or sulfathiazole powder. Many of the wounds had been débrided and had had foreign bodies removed. We noted in many cases that the flesh wounds that did best were those that had received as initial treatment mechanical cleansing, sulfonamide powder locally and no débridement.

Compound fractures were doing well in closed casts. We were impressed with the excellence of the Orr–Trueta method of treatment. As is generally known, it is much easier for the patient than former methods, for he has few, if any, painful dressings. There is a large saving of gauze and dressing material. This was particularly important when the supply line included several thousand miles of Pacific Ocean. With a large number of seriously wounded patients, there was a tremendous saving of valuable time for the medical officers, who would otherwise have spent long hours on tedious, painful dressings.

After several weeks with the hospital group at Auckland, I went back to the hospital to which I had originally been assigned. During the next thirteen months in New Zealand, we treated many more war casualties. I was particularly interested in burns and was given the assignment of taking care of all burn cases.

The "canned" human plasma with which naval medical units are provided was extremely valuable for treating burns in the early stages. In a base hospital, most of the burns were, of course, not fresh ones, but many patients had been given plasma during the first few hours after injury, and had benefited enormously from it. The few cases of fresh burns that were admitted to our hospital were given large amounts of plasma immediately.

A guest at the hospital, Major J. J. Brownlee, chief plastic surgeon of the New Zealand Army, described to us in detail the methods used in caring for burn cases in England during the German blitz of 1939. At that time, he had been associated with a famous English surgeon, Sir Harold Gillies. Briefly, the English method used in the New Zealand Army was as follows. The burned areas were not débrided. Blebs were not broken. Sulfonamide powder and vaseline gauze dressings were applied immediately after injury. After several days, the patient was put into a full-sized bathtub filled with warm, sterile, slightly hypertonic saline solution. After a few minutes of soaking with the dressings undisturbed, the latter were gently floated off under water. The water in the tub was changed several times until clean. After the bath the patient was lifted out onto a sterile sheet and dried with sterile towels, and vaseline gauze dressings were reapplied. Subsequent dressings were done in exactly the same manner. Masks, gowns and gloves were worn during these procedures to prevent contaminating the open burned areas.

Immediately after Major Brownlee's talk, a bathtub was installed at the end of a ward on which the burn cases were segregated. An ordinary metal bathtub was raised two feet from the floor, so that its rim was exactly the same height as the top of a wheeled stretcher. This elevation was a distinct advantage in getting the patient in and out of the tub. It also made it much easier to work on him while he was lying there. A seventy-gallon tank was constructed on a five-foot platform beside the tub, with a thermometer on it. By hot-water and cold-water connections, the tank was filled with water at 105°F., and enough table salt was added to make a 1 per cent solution. The tub was carefully scrubbed with soap and water, wiped with Lysol solution and rinsed with saline solution before being filled with the warm salt water.

The saline solution was slightly hypertonic, on the theory that, with a greater osmotic pressure than that of the tissue fluids, exchange would be from the burned areas into the bath. The solution was so nearly isotonic and so near body temperature, however, that there was little discomfort for the patient. In fact, patients were usually reluctant to get out of the bath. With the tub nearly full, they floated comfortably, with only a slight amount of weight resting on the bottom of the tub.

A few patients were received who had been treated with tannic-acid jelly days or weeks previous to admission. The saline bath was extremely useful in soaking off the infected eschars. A patient who had been treated with tannic acid for burns incurred when a destroyer was torpedoed was particularly grateful for the bath. He had extensive burns on the face, ears, trunk, arms and legs. We came to the definite conclusion that, in the light of the present knowledge of the treatment of burns, tannic acid in any form is an inferior method of treatment.

Many cases of severe burns were treated with sulfanilamide wax spray. We used approximately the formula originated by Pendleton at the United States Naval Hospital at Mare Island, California. It is as follows:

Paraffin	1000 gm.
Liquid petrolatum	250 cc.
White petrolatum	150 gm.
Cottonseed oil	50 gm.
Sulfanilamide	50 gm.
Menthol	1 gm.
Camphor	1 gm.
Oil of eucalyptol	1 cc.

Patients treated by this method were put to bed in a warm room lying on a sterile sheet with the head on a sterile pillowcase. They were covered only by a cradle. A hospital corpsman sprayed the burned areas with warm sulfanilamide wax solution every two hours, using a common Flit gun. The red-cell count of severely burned patients was followed care-

fully, and after the first few days, whole-blood transfusions were given whenever indicated.

Before leaving the South Pacific, we had the opportunity of treating a case of severe burns with gentle-pressure dressings over vaseline gauze, together with a course of penicillin. This method seems to hold great promise of becoming the best way to treat fresh, severe burns.

Third-degree burns were cleaned up as quickly as possible and skin was grafted, using the Padgett dermatome or the Humby knife. Pinpoint grafts were used in cases in which there had been much infection. The Humby knife is an English instrument. It is much like our Blair–Brown knife, and is an extremely useful instrument.

All major skin grafts of the extremities were put in plaster casts for seven to eight days after operation. The patient was given 4 gm. of sulfadiazine a day, starting two days preoperatively and continuing until the first dressing was done, a week after operation. This first dressing was always done in the saline bath, after the cast had been removed.

Amputations were, fortunately, relatively few. I recall only one patient who had lost more than one extremity — a man who had lost both feet and one hand. Amputations were mostly surgical, and of the open or guillotine type. They had been done at some point near the front line to prevent infection or for nearly complete severance of the affected limb.

All guillotine amputations were placed in skin traction, using adhesive plaster and a pulley and weight over the foot of the bed. This was, of course, effective in the prevention of retraction of the skin edges. It also provided a much better final weight-bearing stump by lessening the amount of scar tissue and increasing the amount of normal tissue over the end of the stump.

It is extraordinary how little pain a traumatic amputation may cause. An Australian sailor from the cruiser *Canberra* gave me the following amazing story. During the battle in which his ship was finally sunk, there was a tremendous impact as a Japanese projectile struck his ship. He was spun around against a bulkhead but was able to remain in a standing position. He then observed a severed arm lying on the deck near his feet, and said that his first impulse was to feel sorry for its owner. He said that he did not realize that the arm was his own until he recognized a familiar ring on the finger.

Among several cases of penetrating wounds of the chest, I treated only one that resulted in empyema. In most cases there were varying degrees of hemothorax. Aspiration was done only for respiratory embarrassment or for diagnosis in cases of suspected sepsis.

One officer had been shot through the chest by a small-caliber bullet, which had not struck a rib. Three weeks later, when I saw him for the first time, the wounds of entrance and exit had completely healed and he appeared to be symptom-free.

Penetrating wounds of the abdomen were few. One case well demonstrated, however, the importance of meticulous examination after injury by multiple shell fragments. A large fragment had badly fractured the patient's lower jaw, diverting attention to his head. About two weeks after injury, he complained of lower-abdominal pain and inability to void. Careful physical examination showed a recently healed 6-mm. scar in the left side of the abdomen and a deep pelvic abscess. X-ray examination revealed a small particle of steel within the pelvis, which had evidently caused a small, leaking puncture of the sigmoid. The abscess was drained by rectum and the patient recovered.

The subject of foreign bodies is interesting, and we all had considerable experience with them. In one case we counted over 200 of them, mostly tiny, in the back, arms, buttocks and legs. The patient had been standing near an exploding shell on the deck of a cruiser. We came to the conclusion that foreign bodies, unless they cause symptoms or are very large, need not be removed. If they cause infection, lie in joints or cause symptoms by involving vital structures they should be removed.

After fourteen months in New Zealand, I was ordered to a base hospital on an island situated within a few hours by air of the fighting zone in the Solomon Islands. The climate there was entirely different from that of New Zealand. The weather was intensely hot and humid, with a tremendous rainfall. The hospital was well located, however, in a shady coconut grove, on top of a slope where we got whatever breeze was blowing. The natives were of the extremely black type known as Melanesians. There were also many Tonkinese laborers imported during peacetime from French Indo-China to work on the coconut plantations. Tropical diseases were well controlled by careful sanitation. Nearby swamps were drained, puddles were oiled, and natives were segregated from the shore installations, as precautions against mosquito-borne diseases.

Although this island had been notorious for malaria before the war, the sanitation was so good by the time I reached there that one could sit with impunity at an open-air motion-picture show during the evening without fear of dangerous mosquito bites. All hospital buildings were of course carefully screened against insects.

An interesting public-health measure was the picking of all coconuts, from the palms on the hospital compound. This was done because several men had been injured by falling coconuts, and also to avoid having empty coconut shells lying around as breeding places for mosquitoes. Flies, which had been somewhat of a nuisance when we first arrived on the island, were controlled by covering all latrines and garbage.

During the last few weeks of my stay in the South Pacific, penicillin became available in limited quantities. We treated 23 cases, with some improvement in all but 2 cases. One case that failed to improve

was that of a marine who had been shot through the right adrenal gland at Bougainville and had developed a large retroperitoneal and retropleural abscess. He finally succumbed to chronic sepsis and a terminal hemorrhage. The second case was that of a marine who arrived, suffering from a large subphrenic abscess, as a complication of acute appendicitis. He was given penicillin for a week before operation, without improvement. He made a good recovery after 1200 cc. of pus had been drained surgically. It might be added that the abscess cavity on two occasions was washed out with penicillin solution after operation; this may have helped his recovery.

The 21 cases that showed improvement included two patients with suppurative keratitis of the eye, both due to foreign bodies. Both had developed sepsis in the anterior chamber of the eye before penicillin was started. The ophthalmologist considered that their improvement after they were given penicillin was remarkable. Another case was that of a sailor with a septic knee joint of three days' duration, due to a small penetrating stab wound. Without aspiration or drainage, the knee improved rapidly with penicillin treatment. Other cases included a severe burn, a severe furunculosis and several compound fractures due to gunshot wounds.

All the above cases were treated with 15,000 units of penicillin in 15 cc. of 5 per cent dextrose in saline solution, given intravenously every three hours. In most cases this treatment was continued for a week — a total of fifty-six doses. One patient developed a slight phlebitis at the site of the injections, in the antecubital space. The dilution of penicillin was then doubled, giving 500 units per cubic centimeter instead of 1000. The phlebitis then subsided. No other harmful results from penicillin were seen.

Several cases of sulfonamide-resistant gonorrheal urethritis were treated with 20,000 units of penicillin intramuscularly every three hours for five doses. The dilution used was 5000 units of penicillin per cubic centimeter of saline solution. The result seemed extraordinarily good in all cases, although my transfer to the United States prevented an adequate follow-up.

Besides war injuries, there were many cases of the usual peacetime surgical ailments. Appendicitis, hernia, hemorrhoids and infected pilonidal cysts were probably the most frequent ones.

Pilonidal cysts were possibly aggravated by the hot climate and by sitting on hard surfaces, such as wooden benches and jeeps. At operation, a few small cysts that were not badly infected were excised and closed with through-and-through sutures of fine stainless-steel wire. Sulfanilamide powder was applied to the raw surfaces several times during the operation. There was not a large enough series or enough follow-up to draw definite conclusions, but the majority of the wounds closed in this manner appeared to heal by first intention.

The problem of anesthesia was an interesting one in the South Pacific. Pentothal proved extraordinarily useful for almost all types of minor operation. In the heat of the tropical islands, drop-ether anesthesia was somewhat difficult, owing to the rapid evaporation of the ether, but worked perfectly well in spite of this. Spinal anesthesia was usual for laparotomies and major procedures on the lower extremities.

We saw a few cases of filariasis, a mosquito-borne disease endemic in some of the South Sea islands. There appears to be much current rumor and misinformation about the nature of this disease. After having been bitten by an infected mosquito, the patient several months later develops a temporary lymphedema of the arm, leg or scrotum. Elephantiasis may occur as a late complication, but only after repeated infections by new mosquito bites over a long period of years. According to a doctor who spoke at the hospital after three years of peacetime practice in Samoa, a patient with filariasis need not have any fear of elephantiasis unless he remains for many years in the infected area and suffers recurrent attacks. In Samoa, the recurrent attacks of slight swelling due to filariasis are called by the natives "*moo-moo*." One sometimes hears filariasis referred to as the "*moo-moo* disease."

The patients at naval hospitals are sailors and marines. As most people know, the United States Marine Corps does not have its own doctors. Navy doctors are assigned to duty with the marines at the front, and hospitalized cases are sent back to naval mobile or base hospitals. The average sailor or marine is young and healthy. These men make excellent patients, with tremendous powers of recuperation. They complain very little and are most appreciative of a doctor's care, when such care becomes necessary. It has been a real privilege to have had the opportunity of taking care of some of these men.

* * *

The above is an account of twenty months' service in the United States naval hospitals in the South Pacific. On account of censorship regulations, most dates, places, numbers and so forth have necessarily been omitted. A few definite surgical impressions that have been gained during this work are as follows:

The combination of mechanical cleansing, sulfanilamide, and immobilization is the best way to treat most flesh wounds, and in wounds so treated, débridement is usually unnecessary and harmful.

Foreign bodies, unless they cause symptoms or are very large, need not be removed.

The Orr–Trueta method of closed-plaster treatment of compound fractures was highly successful.

Burns are best treated by gentle-pressure dressings over vaseline gauze, together with sulfanilamide or penicillin.

STENOSING TENDOVAGINITIS AT THE RADIAL STYLOID PROCESS (DE QUERVAIN'S DISEASE)

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STENOSING tendovaginitis at the styloid process of the radius is a relatively frequent disease, but despite this fact it is not well known. There have been but few reports of this condition in the literature since it was first described by DeQuervain in 1895, and it is not discussed in the standard textbooks. Although the disease presents a clear-cut clinical picture, which makes the diagnosis easy, it is often unrecognized by the general practitioner or the industrial surgeon.

The disease is seen chiefly in women. With the present marked increase in the employment of women in industry it is more frequently encountered than formerly. Unless properly diagnosed and treated, its victims are subjected to a prolonged and painful period of disability.

Stenosing tendovaginitis is due to a thickening of the fibrous sheath that covers the tendons and the synovial sheaths of the abductor pollicis longus and the extensor pollicis brevis as they pass through the bony groove in the radial styloid. As the tendons emerge from this tunnel they diverge sharply, the abductor inserting into the lateral aspect of the base of the first metacarpal and the extensor inserting into the dorsum of the base of the proximal phalanx of the thumb (Fig. 1). Because of the divergence of these tendons, considerable tension is exerted on the fibrous sheath on extension and abduction of the thumb. It is thought by some that this tension, exerted repeatedly over a period of time, is the cause of the thickening or stenosis of the fibrous sheath. This may be true, but there is a definite relation between this condition and that of trigger finger or thumb. One in this series of 15 patients has developed bilateral trigger thumbs, and another had been previously operated on for trigger finger. Four have also developed mild symptoms of infectious arthritis. If trauma were the only cause, one would certainly expect to see the condition more frequently in men who do more heavy laborious work. The disease, however, does not often occur in men.

At operation the fibrous sheath, which is about 1 cm. in length, is found to be markedly thickened. At times it is nearly 0.3 cm. thick and has the consistence of cartilage. When the sheath is opened the lining synovial membrane is found to be markedly injected. Free fluid is noted in some of the more acute cases. Usually, however, the synovial membrane is bound down to the tendons by dense adhesions that can be removed only by sharp dissection. These may be so injected as to have the appearance of pannus formation. The tendons themselves may present definite grooving, owing to the pressure of the stenosed sheath. Not infrequently the tendons appear swollen on each side of the point of constriction.

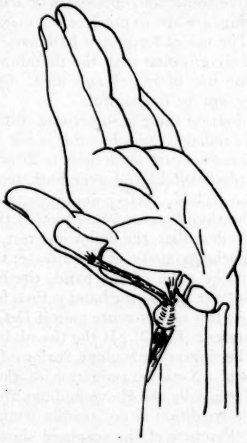

FIGURE 1. *Diagram Showing the Location of the Fibrous Sheath at the Radial Styloid and the Divergence of the Short Extensor and Long Abductor on Abduction or Extension of the Wrist.*

The onset of the disease is usually insidious, without a history of trauma. Symptoms may be present for several months but grow progressively worse. The pain finally becomes so acute as to cause disability. The symptoms may be minimal in the housewife, but become acute if she takes up work that requires the use of the thumbs. Acute cases following a single trauma are sometimes seen. In such cases a past history of mild discomfort on certain motion can usually be obtained. The acute symptoms following a direct blow in these cases are caused by acute edema of a previously thickened fibrous sheath. In other cases they are due to an acute tenosynovitis and not to true DeQuervain's disease.

The disease is seldom seen in persons under twenty-five years of age. It occurs in industry in women whose work requires the use of forceps and in cooks who use heavy pans. Three of the reported

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cases occurred in nurses, whose chief complaint was inability to shake down a clinical thermometer. The disease is frequently seen in the housewife, who complains of a tendency to drop things because of pain, and particularly of pain on attempting to wring out clothes.

In the acute stage there is severe pain over the radial side of the wrist joint, especially on motion of the thumb. The pain is localized directly over the styloid of the radius, with radiation into both the thumb and forearm. Any motion of the hand or wrist may be painful, but motions of the thumb, such as active abduction, opposition or acute flexion, as in gripping, are apt to produce the maximum discomfort. The use of forceps or hammers, which require not only gripping with the thumb and fingers but also the use of radial and ulnar flexion, are particularly apt to be painful.

On examination there is sometimes distinct swelling over the radial styloid, but this is not a frequent finding. There is acute tenderness to direct pressure over the radial styloid and over both tendons just distal to the styloid. Active abduction and passive flexion of the thumb cause acute pain at the styloid. Finkelstein* describes the following test, which is said to be pathognomonic of the disease: the thumb is placed in the palm of the hand, the fingers are flexed firmly over it, and the hand is then forced into ulnar flexion; this causes acute pain if DeQuervain's disease is present (Fig. 2). If the thumb is released, flexion of the fingers with ulnar flexion of the hand is not painful. X-ray examination of the wrist is negative. Ordinarily the above findings are so clear-cut that the condition is not readily confused with any other. Fracture of the scaphoid shows tenderness in the anatomical snuffbox but not over the tendons or the radial styloid. Motions of the thumb are not painful in scaphoid fractures, as in DeQuervain's disease.

Most patients when first seen have had pain for several weeks. All sorts of casts, splints and apparatus have been used. While immobilized, most patients are fairly comfortable, but on removal of the splints and with resumption of work, the symptoms have promptly recurred. In general, conservative treatment is not particularly successful. The acute cases of tenosynovitis are relieved by rest. Rest itself, although it may allow edema of the sheath to subside, does not cause the fibrous thickening to disappear.

The treatment of choice is surgery. The operation is simple and is followed by uniformly good results. Under novocain anesthesia an incision 4 cm. in length is made over the long abductor and short extensor of the thumb. These tendons can be readily identified, since they form the lateral boundary of the anatomical snuffbox. On opening the thin layer of subcutaneous tissue the fibrous sheath is readily found. The sheath is split with a sharp knife throughout its length and its edges are retracted, exposing the underlying tendons and synovial sheaths. If adhesions are present between the sheaths and tendons, they are excised. It has been my custom also to excise the edges of the fibrous sheath. No attempt is made to close the sheath over the tendons, the only closure required being that of the skin. A compression dressing is applied.

Motion is started on the day following operation. Ordinarily work can be resumed two weeks after operation. There has been no recurrence in this series of cases. Because of the location of the incision and the encouragement of early motion, there has been a tendency for the postoperative scar to be somewhat keloid in type, but the results of surgery have been so satisfactory as to make it the treatment of choice. By early diagnosis and treatment not only is a prolonged painful disability prevented, but many man-hours are saved.

FIGURE 2. *Finkelstein Test.*
The thumb is placed in the palm of hand, and the fingers are flexed firmly over it. On ulnar flexion in cases of DeQuervain's disease, acute pain is experienced over the radial styloid.

SUMMARY

Stenosing tendovaginitis at the radial styloid process is a frequent but seldom recognized condition. It occurs chiefly in women over twenty-five years of age. It is often a source of disability in housewives, particularly those who have recently

*Finkelstein, H. Stenosing tendovaginitis at radial styloid process. *J. Bone & Joint Surg.* 12:509-540, 1930.

gone to work in war plants. The true cause of the disease is not known, but trauma plays at least a part in the aggravation or precipitation of symptoms. Once the condition is recognized as a clinical entity, the diagnosis is easy. The condition responds promptly to surgery. Many lost man-hours can be avoided if the medical profession will learn to recognize this disease and to institute proper treatment.

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MEDICAL PROGRESS

SYPHILIS (Concluded)

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CONGENITAL SYPHILIS

A thorough study of congenital syphilis from the standpoint of fetal autopsy findings has been reported by Dippel.[102] The perivascular tissues of the liver and lungs generally yielded the largest number of spirochetes. Sixteen (24 per cent) of 67 fetuses of syphilitic mothers showed spirochetes in the tissues. It is interesting that 2 of 9 fetuses of Wassermann-negative mothers yielded spirochetes. This is an excellent illustration of the fact that negative serologic findings in the mother are no assurance against congenital syphilis of the child. It bears out the wisdom of the long-held tenet that any woman who has had syphilis should be treated throughout each pregnancy. Spirochetes were not found in fetal tissues prior to the eighteenth week of gestation. It is obvious from this that the syphilitic mother must receive therapy prior to the eighteenth week if her child is to be protected against syphilitic infection. A study of 100 syphilitic mothers and their offspring from a different standpoint has been carried out by Miller.[57] These cases are analyzed from various statistical angles, and criteria for the diagnosis of syphilis of the newborn are described. This author holds that even if all findings are negative in the child of a syphilitic mother, the infant should be re-examined every three months for the first year. It is stated that the child should be closely followed during the first five years of life and that surveillance should be continued to or beyond adolescence. One case is cited in which nothing was found until the child was nine years old. Miller does not believe that syphilis of the placenta can be diagnosed without isolation of the spirochete. X-ray examination of the long bones has proved unsatisfactory to this author as a diagnostic measure. The last statement is contrary to the opinions of most syphilologists.

The rate for congenital syphilis in infants less than one year of age reported from Scotland for the years 1931 to 1942 inclusive showed a decrease of over 50 per cent.[58] The scheme used in Glasgow for the handling of syphilis in the mother and child is based on the general principle that venereal diseases in these patients should be treated where they are detected. Thus, the pregnant syphilitic woman receives therapy in an antenatal clinic and the congenital syphilitic child is treated in a child welfare clinic. The management of syphilis is thus considered an integral part of maternity and child welfare. Doubtless this contributes greatly toward co-operation on the part of the patient.

What seems to be a most promising report on the treatment of interstitial keratitis has been given by Stone.[59] Vitamin E in the form of wheat-germ oil was used in 10 patients with advanced interstitial keratitis, all of whom had previously received ample antisyphilitic therapy. Four patients had also received artificial-fever therapy. Vitamin E was mainly effective in hastening absorption of superficial and deep corneal exudates; it helped to relieve the associated photophobia and reduced excessive corneal vascularization and circumcorneal congestion. Its administration was carried on over a period of months. In one case, complete clearing of the cornea occurred after eighteen months of vitamin therapy, although only light perception was present in one eye, and perception of fingers in the other, when therapy was begun.

The possibility of confusion between congenital syphilis and scurvy in infants is illustrated in a publication by Levin.[60] A child of fourteen months

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with the typical stigmas of congenital syphilis was thought to have Parrot's pseudoparalysis, although the blood reaction was negative for syphilis. Roentgenologic studies revealed periosteal hemorrhage due to scurvy, with associated rickets. This author found that the majority of infants under six months of age with congenital syphilis have low ascorbic acid levels. He believes that syphilitic infants should be given extremely larger doses of ascorbic acid at an earlier age, since some of the osseous changes ascribed to congenital syphilis are in all likelihood evidence of subscorbutic and subrachitic disturbances.

Therapy

Penicillin

There are innumerable publications on the use of penicillin in infections of all sorts. Its usefulness has apparently been well defined, and it is most fortunately devastating in effect on *T. pallidum*. The action of penicillin on this organism has been carefully studied in vitro and in experimental animals.[61] It became clear from this work that, in the treatment of human syphilis, care must be exercised to administer a sufficient quantity of penicillin to cure the patient rapidly; otherwise there is the possibility of producing a penicillin-resistant strain. In collaboration with the Penicillin Panel, the Subcommittee on Venereal Diseases of the National Research Council, the Army, the Navy .and the United States Public Health Service are continuing studies to evaluate the effects of penicillin in the treatment of syphilis. The Army is operating two treatment centers where, under the supervision of specially qualified personnel, early syphilis is being treated.[62] This therapy is being studied from several standpoints, and special procedures have been established to assure a minimum follow-up period of twelve months. The optimum dose schedule has not been determined. Some cases have received as much as 2,500,000 units in a week. The immediate response is excellent, but it should be stressed that no one can foretell the future.

The treatment of early syphilis with penicillin has been continued by Mahoney and his associates.[63] One million, two hundred thousand units in about eight days produced a favorable response in very early infections. An increase in probable failures in patients with secondary syphilis seemed to indicate the need of more vigorous therapy. These authors believe that an increase in the purity of penicillin would effect a distinct improvement in treatment. The development of a method for assaying the spirocheticidal activity of the product would also be of distinct value. They emphasize again that the final value of any treatment for syphilis must await the passage of time. Another group of observers headed bo Moore[64] have published a preliminary report of the treatment of 1418 cases of early syphilis with penicilln. Various treatment schedules were used, and some patients were followed as long as forty-eight weeks. Profound immediate effects were observed — the disappearance of surface organisms from open lesions, the healing of lesions and a trend toward serologic reversal. Relapse appeared to be more frequent after intravenous than after intramuscular injection of comparable doses. The lowest incidence of relapse and the most notable serologic response were in small groups of patients treated with subcurative doses of penicillin and Mapharsen. A favorable effect was also found in early asymptomatic neurosyphilis, acute syphilitic meningitis, early syphilis resistant to routine chemotherapy and infantile congenital syphilis. It was thought that the minimum dose, especially in secondary syphilis, should not be less than 1,200,000 units and that probably it should be more. Herxheimer reactions were frequent but not serious; other reactions were negligible. Smaller groups of patients with early syphilis have been reported by a number of authors with essentially the same results.

Eight clinics were selected for the study of the effect of penicillin on late syphilis, and a total of 182 cases of syphilis have been reported[65]; these were preponderantly neurosyphilis (122 cases) but included benign late syphilis and late congenital syphilis. Benign gummatous syphilis of the skin and bones healed under a relatively small dosage (300,000 units). The abnormal spinal fluid in neurosyphilis was improved to some degree in 74 per cent, and definitely in 33 per cent. The symptoms in neurosyphilis improved less dramatically but to an encouraging extent. The response in interstitial keratitis was varied; at times it was strikingly favorable, but 2 of 14 patients were made distinctly worse. Therapeutic shock effects from penicillin in late syphilis may be serious and should be guarded against by reduced dosage during the first twenty-four hours. It is difficult to evaluate results in miscellaneous groups of cases of late syphilis, and much more time will be required to observe the durability of results.

Still another group of investigators have studied the use of penicillin in the prevention and treatment of congenital syphilis.[66] Although only 14 pregnant women with early syphilis and 9 infants with congenital syphilis were treated, preliminary observations indicate that sodium penicillin has a good effect in both types of case. The limited data seem to indicate that from 1,200,000 units to double that amount, in approximately eight days, is well tolerated by the pregnant woman. Reduced dosage during the first thirty-six to forty-eight hours is advocated. Preliminary results indicate that the infection is controlled and that the infants are born apparently healthy. Here again it is emphasized that the period of observation for either mother or child has not been long enough to be certain of results. The response to treatment with

penicillin was also most encouraging in the congenital syphilitic infant.

Two interesting reports have appeared that emphasize the possibility of partial suppression syphilis by the penicillin therapy of gonorrhea.[67, 68] The amount of the drug used in treating gonorrhea is usually not over one tenth that required in the treatment of syphilis, and may be given within twenty-four hours. It is easily understandable therefore that the treatment of gonorrhea with penicillin may serve to obscure the earliest manifestations of syphilis. The progress of syphilis would not be prevented, and a latent period followed by recurrence or the appearance of late lesions might result. This suggests that, in patients with gonorrhea treated with penicillin, the period of observation for syphilis should be greatly extended.

Although most investigators observed only the Herxheimer phenomenon and a few minor reactions, some reports have appeared that may be warning notes. Hypersensitivity of the tuberculin type has been observed.[69] Urticarial reactions have been frequently observed, and one severe case of urticaria has been described.[70] The occurrence of contact dermatitis from penicillin has also been reported.[71] It is to be ardently hoped that these will not be forerunners of graver systemic reactions to penicillin. One of the remarkable features of this drug has been its comparative freedom from serious deleterious side actions. One cannot help but recall the sulfonamide group, which started out almost as auspiciously but soon came to be regarded with an almost fearful respect because of the reactions accompanying the use of these drugs.

Attention should be called to the fact that penicillin is now available to a limited extent for the treatment of early syphilis in civilians. All cases must be hospitalized, both charity and private, throughout the treatment. An allotment of 1,200,000 units is available for each patient. In Massachusetts this can be obtained from the State Department of Public Health.

There is one point on which complete unanimity of opinion seems to have been achieved by all investigators in the use of penicillin. This is the fact that the results, although encouraging, must be considered preliminary. It is of utmost importance that this fact be universally realized, and it will be extremely unfortunate if the lay press overstimulates the hopes of the public. Although immediate results are comparable with the best of other intensive treatment schedules, this by no means indicates that the *T. pallidum* has been completely destroyed throughout the body. Early recurrence or late sequelae may yet occur. The most careful observations and control of penicillin-treated patients will be necessary over a period of perhaps twenty years before any conclusion can be drawn concerning the ultimate effect. Dosage has so far been purely tentative. The optimum time-dosage relation has not been worked out. It is obvious then that the penicillin treatment of syphilis must be regarded as an experimental procedure for many years to come. New methods of administration may have to be devised. Penicillin excretion is known to be rapid, which necessitates repeated injections at intervals of three or four hours. A method of renal excretory blockade has been suggested.[72] Thus the action of penicillin can be prolonged and a therapeutic level of penicillin maintained in the blood for a longer time. Methods of slowing and prolonging penicillin absorption from the injection site are also mentioned.

Intensive Therapy

There has been continued study of the rapid intensive administration of chemotherapy for syphilis. A preliminary analysis of results of short courses of triweekly injections of Mapharsen has been published by Eagle.[73] The first 4823 cases so treated are reported. About three fourths of the patients had early syphilis. Two thirds of them were given concomitant weekly injections of a bismuth compound. Triweekly injections of Mapharsen without bismuth gave uniformly poor therapeutic results regardless of dosage. On the basis of observations over a period of fifty to sixty weeks from the beginning of treatment, it is believed that triweekly injections of Mapharsen (approximately 1 mg. per kilogram), combined with weekly injections of bismuth subsalicylate (1.2 gm.) and continued for nine to twelve weeks, probably "cure" 85 to 90 per cent of the cases of early syphilis. The mortality in this series was slightly less than 0.1 per cent, but the authors believe that half these deaths were preventable. There is also a report covering the treatment of 332 cases of early syphilis with massive doses of arsphenamine by the syringe method in a period of five or six days.[74] Three to four injections were given daily. There was a distressingly high incidence of reactions, and grave complications were numerous. The percentage of satisfactory results was comparatively low, and the authors themselves concluded that the method was altogether unpractical. This is not unduly surprising, since it has been long known that arsphenamine is much better tolerated when given slowly in high dilution.

Another study has been reported by the United States Public Health Service.[75] This is an evaluation of massive arsenotherapy for syphilis as carried out in twenty-two co-operating clinics. A total of 4351 patients were treated. Several methods of administration were used, and three arsenical drugs were employed. In one series, typhoid vaccine was combined with multiple-syringe injections of Mapharsen. This group of patients gave the best results, when considered from the standpoint of "cure" balanced against reactions. It was calculated that this should prove effective in 85 to

90 per cent of cases of primary syphilis and in 70 per cent of cases of secondary syphilis. The administration of bismuth during the period of treatment appeared to improve the results. Relapses occurred in about 5 to 6 per cent of the cases of primary syphilis and in 10 to 13 per cent of those of secondary syphilis. Still another series of 487 patients with early syphilis was treated on a five-day schedule.[76] In this group the technic was intravenous-drip therapy with Mapharsen in dosages of from 900 to 1200 mg. In over half the cases bismuth was also given. The treatment fatality rate was 0.76 per cent. Fifteen per cent of all patients followed for five months or longer developed serologic or mucocutaneous relapse. Those receiving bismuth in addition to Mapharsen responded more satisfactorily. The authors estimate that the rate of "complete cure" will not be less than 70 per cent. Additional reports of smaller groups of cases show confirmatory results.[77, 78] The intensive treatment program used by the Army has consisted of forty injections of arsenoxide, given twice weekly, with additional injections of bismuth, covering a total of twenty-six weeks.[14] This system is merely a modification of a former schedule, and the total amount of drug administered (2400 mg.) is about the same. So far the shortened scheme results have been excellent and there has been no increase in toxic reactions.

Combined Fever Therapy and Chemotherapy

Thomas and Wexler[79] have continued their excellent work with the combination of arsenotherapy and fever. They have tried out several treatment schedules, seeking to avoid the grave reactions that were encountered in earlier work when a one-day treatment had been attempted. The theory back of treatment by this method considers the physiologic effects of fever in the host, which make for increased resistance to the infection, and the direct effect of heat on *T. pallidum*. Although kidney damage was alarming in some of the earlier cases, these authors[80] observed that no noteworthy renal injury was found when the fever produced by physical means was not prolonged beyond five hours. In their last report Thomas and Wexler[81] review two thousand one hundred and forty-four courses of treatment administered to 2023 patients. The great bulk of these patients had primary and secondary syphilis, and the vast majority were treated with Mapharsen and typhoid vaccine. Daily injections of the former in doses of about 1 mg. per kilogram of body weight and four fever sessions induced by the latter in a ten-day period produced optimum results with a minimum of reactions of any sort. Among patients followed for six months or more after treatment, about 80 per cent showed satisfactory results; if retreatments are included the satisfactory results are 85.6 per cent.

An improvement in the use of typhoid vaccine to produce fever has been reported by Solomon and Somkin.[82] This technic consists of the introduction of a high dilution of typhoid vaccine via intravenous-drip infusion. By this means therapeutic temperature levels were reached and sustained for several hours. A simplification of this method has more recently appeared.[83] Lawrence[84] has applied the technic in 10 patients who were presumably immune to typhoid bacilli. Ten times the amount of typhoid vaccine originally recommended was employed with satisfactory results. Mapharsen was given at the height of the fever, and bismuth was administered twice weekly on afebrile days. It should be noted that some of the advantages of the use of typhoid vaccine to produce fever are the comfort of the patient, the freedom from a feeling of increased body heat and restlessness, which patients experience in cabinet treatments, and the avoidance of the need of supportive therapy. The mental state of the patient is also unaffected. Cohen and Hale[85] have likewise reported on the clinical application of this continuous intravenous-drip technic with typhoid vaccine. Its more effectively regulated fever is a particular advantage. It also appears to be therapeutically effective in producing fever in malaria-resistant cases. Another publication on the one-day treatment of syphilis with fever and Mapharsen is available.[86] The results were encouraging, but the series was comparatively small.

The use of malaria in the production of artificial fever in the treatment of syphilis has not been abandoned, in spite of the preponderance of reports concerning other methods of hyperpyrexia. Dattner, Thomas, and Wexler[87] treated 419 neurosyphilitic patients with malaria followed by some form of chemotherapy; of the 424 courses of treatment, 148 consisted of routine chemotherapy, and 276 of a daily injection of Mapharsen for ten days before leaving the hospital. No special differences were noted in the results of the two groups. Much time was saved in the cases in which the ten consecutive daily injections of Mapharsen injection were used. Nearly all forms of neurosyphilis were included in the series. On the basis of the spinal-fluid findings, examinations made six months or more after completion of treatment showed "satisfactory" results in 85.9 per cent. From a clinical standpoint the outcome was less satisfactory but nevertheless encouraging. An interesting survey of twenty years' work in the treatment of neurosyphilis has been published by Nicole.[88] In a series of 604 patients, 424 were treated with malaria, the intramuscular method being preferred. In 81 patients, a second attack of malaria was successfully induced, and in 15, a third attack was produced. This author believes that reinoculation attained improvements that could not have been secured by any other means. Recoveries were obtained even in acute and advanced cases, and the addition of chemotherapy led to a higher

recovery rate. A comparatively new pentavalent arsenical, Aldarsone, has been used in conjunction with artificial fever in a small series of patients.[89] The results compare favorably with those of combined artificial fever and Mapharsen therapy. Earlier use of this drug had indicated fewer ophthalmologic complications than those encountered with tryparsamide. In the present series, eye complications were observed in nearly 10 per cent of the patients, which is not encouraging.

Routine Chemotherapy

A comprehensive study of the results of routine treatment of 5326 patients with latent syphilis over a twenty-year period has been reported by Diseker, Clark, and Moore.[90] Of this group there were 926 who were observed for five years or longer and who had a complete physical re-examination at the end of this observation period. Six hundred and thirty (68.0 per cent) had what was considered satisfactory results; an additional 239 (25.8 per cent) were considered probably satisfactory outcomes. The latter were those in whom there was an absence of clinical progression but in whom no re-examination of the cerebrospinal fluid was obtained. These two groups comprised 93.8 per cent of the total number observed. Although this study reports a random sample of the total group, the authors believe that their findings strongly indicate that patients with latent syphilis do extremely well irrespective of the type of treatment received. The optimum amount of therapy to reduce progression of latent syphilis to a minimum is considered to be approximately twenty injections each of an arsenical and a heavy metal.

For some years sulfarsphenamine has been held in gross disrepute by syphilologists for all purposes except the treatment of early congenital syphilis. An interesting study has been reported comparing the toxic manifestations of neoarsphenamine and sulfarsphenamine.[91] A clinic of the United States Public Health Service was utilized for this work. A total of nearly seventeen thousand intravenous injections were given over a period of eighteen months; slightly more than half this number were neoarsphenamine, and the remainder sulfarsphenamine. The reaction rate for neoarsphenamine was so little less per thousand injections than that for sulfarsphenamine that it was considered of no statistical significance. Laboratory investigations indicated that sulfarsphenamine is definitely more stable than neoarsphenamine and apparently more active treponemicidally. This work suggests that the use of sulfarsphenamine deserves more study.

A new series of bismuth compounds has been isolated, and one in particular, dihydroxypropyl bismuthate, has been studied pharmacologically and clinically.[92] The bismuth is not present as a free ion and does not coagulate and precipitate protein. It is stable in solutions ranging from mildly acid to extremely alkaline in reaction. This allows it to pass through the stomach and remain soluble in the normally alkaline intestinal fluid, making intestinal absorption possible in amounts previously unattainable. Oral administration may thus produce a high and uniform blood level of bismuth, comparable to that obtained in standard intramuscular therapy. Compounds of this bismuthate series are also suitable for intramuscular injection.

Treatment Reactions

The use of crude liver extract in the prevention and relief of toxic manifestations of arsenical or heavy-metal therapy has been studied by Astrachan.[93] In a group of 52 patients with various systemic disturbances, previous histories of intolerance to drugs, skin eruptions and other complicating conditions, 47 were distinctly improved with the use of liver extract as a supportive measure. In all cases, arsenic or the heavy metal was tolerated when supportive liver-extract therapy was administered. In cases in which liver was used as a preventive measure, injections were given fifteen minutes before the arsenical or heavy metal was administered. Patients with gastrointestinal disturbances were the most markedly benefited.

In view of the serious renal complications that may be encountered with intensive therapy of early syphilis, it seems of value to point out that there is a type of nephrosis that may be associated with untreated early syphilis. An excellent example is reported by Klein and Porter.[94] Syphilis was not recognized as the cause of nephrosis in this case until a typical secondary eruption appeared several days after admission to the hospital. The blood serologic reactions were positive for syphilis. After the first injection of Mapharsen there was a rapid improvement in all symptoms.

Visual impairment during tryparsamide therapy has been discussed by Potter.[95] In so-called "chronic reactions," this author does not believe that the dose of the individual injection, the number of injections or the length and number of courses of injections are associated with visual effects in a consistent manner. The subjective reaction of flashes, sparks or spots before the eyes, together with visual distortion and slightly decreased central visual acuity, is said to occur in 5 to 10 per cent of patients receiving tryparsamide therapy. Objective changes are found on examination in 4 to 5 per cent of patients, with permanent unfavorable results in about 1 per cent. This type of reaction consists of contraction of the visual field and moderate depression of central vision. All these symptoms are classified as chronic, and the prognosis for the restoration of vision is good if the drug is promptly withdrawn. Acute reactions, on the other hand, usually occur prior to the fifth injection and are characterized by rapid deterioration of both central and peripheral vision. The exact nature of the reaction to

tryparsamide remains obscure. It is emphasized that close ophthalmologic observation during treatment is vital and usually provides adequate warning of impending disaster. The same author[96] has also described 4 cases of acute visual reactions among 500 patients receiving tryparsamide therapy, an incidence of slightly less than 1 per cent. The cases described are typical, and it is emphasized that the prognosis is only fair, regardless of treatment.

Anwyl-Davies[97] reports a survey of postarsenical jaundice and dermatitis occurring among a group of 3422 male patients over a period of thirteen years. About two thirds of these patients received neoarsphenamine, and the remainder Mapharsen. The neoarsphenamine-treated cases were complicated by jaundice more than twice as often on a percentage basis and developed dermatitis nearly six times as frequently as those receiving Mapharsen. This author is of the opinion that most of the postarsenical reactions are due to decomposition products or to toxic substances occurring in the manufacture of the organic arsenicals. Additional factors, such as the use of alcohol, starvation and respiratory and renal diseases, are considered to be possible contributory influences in jaundice.

The United States Navy statistics for the year 1942 are interesting in respect to arsenical dermatitis.[98] Dermatitis comprised 49 per cent of the total reactions for that year. The incidence of arsenical dermatitis in each series of doses was 0.014 per cent. Premonitory signs occurred in 5 of the 17 cases observed.

Some of the complications of artificially induced fever in the treatment of syphilis of the central nervous system are discussed by Etter.[99] The more serious ones are hemorrhage, circulatory collapse and heat stroke. Minor complications include apprehension, restlessness, herpes simplex, nausea and vomiting. The author believes that the routine administration of dextrose by mouth and parenterally before treatment and oxygen continuously during all fever sessions prevents most complications. Additional fluid or dextrose may be required during treatment. The serious complications may require immediate termination of the fever. Winters[100] points out that therapeutic artificial fever may cause temporary or permanent injury to the male sexual organs. Herpetic lesions of the cornea have been reported during mechanical fever therapy[101]; 9 of 25 patients were demonstrated to have superficial punctate keratitis, some being moderately severe.

Summary

From the public-health standpoint, there is room for considerable optimism in the reduced incidence of syphilis both among military personnel and among the civilian population. This is all the more remarkable in view of the fact that it has been accomplished during time of war. A sobering note creeps in, however, when one considers the gravity of the juvenile delinquency problem. If an increasing percentage of teen-age girls become venders of venereal disease, the foundation of civilization will indeed be undermined. Progress continues in the industrial field; in corporations in which the management proves recalcitrant, the approach may have to be through labor organizations.

False positive serologic tests for syphilis have been receiving a great deal of attention. Improvements in laboratory procedures to identify the false reactions are being attempted, and infectious diseases and other disorders giving rise to false positive reactions have been somewhat more clearly identified.

In the clinical field, certain diagnostic principles that can easily slip the mind of a busy physician not dealing continuously with syphilis are re-emphasized. Means for the identification of atypical lesions are pointed out, and the value of such procedures as lymph-node puncture is cited. Much has been written in the past year in the field of cardiovascular syphilis, and several of the more useful publications are reviewed. Excellent work has been done in the field of congenital syphilis, and one particularly promising report regarding the treatment of interstitial keratitis with vitamin E, which has seemed quite effective in promoting the absorption of corneal exudates, is cited.

Among therapeutic advances, the results obtained following the use of penicillin are outstanding. This potent drug has become available in greater quantity, and an increasing volume of study is being carried out, with most encouraging preliminary findings. Many phases of its use remain to be determined, the matter of adequate dosage not yet having been established. Other methods of rapid and intensive therapy continue to be improved, the combination of fever therapy and chemotherapy being steadily perfected. Some of the more useful and instructive reports regarding treatment reactions are reviewed.

Although penicillin therapy and some of the massive-treatment programs are perhaps the most dramatic elements of this report, it is *imperative* to stress emphatically the experimental nature of all this work. It must be *constantly* borne in mind that ten to twenty years will have to elapse before the ultimate value of any new treatment for syphilis can be accurately determined.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

Weekly Clinicopathological Exercises

FOUNDED BY RICHARD C. CABOT

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CASE 31041

PRESENTATION OF CASE

A fifty-five-year-old Greek was admitted to the hospital with severe abdominal pain and vomiting.

Three days prior to admission, after partaking freely of alcohol, the patient was awakened from sleep by severe nonradiating, midabdominal pain, at first continuous but later intermittent and cramplike in nature. He vomited food mixed with wine-colored fluid, and on one occasion passed bright-red blood by rectum. There were no further bowel movements until entry. There were no chills or fever. A local physician was called, and hypodermic injections were administered for the pain. On the following day the pain diminished but the patient felt weak and remained in bed. On the day prior to admission he vomited green material on several occasions, and again immediately before entrance into the Emergency Ward. The blood pressure was said to have been 80 systolic, 50 diastolic.

The patient had had epigastric pain relieved by food and alkaline powders for two years previously. One and a half years before admission, a gastrointestinal series at another hospital had revealed a constant deformity of the duodenal bulb, which was interpreted as an ulcer. There was no apparent obstruction, the stomach being empty at the end of an hour. A Graham test at that time was negative. He had had an appendectomy eleven years previously.

Physical examination revealed a dehydrated, pale man complaining of abdominal pain. The tongue was dry and coated. The heart and lungs were negative. The abdomen was diffusely tender, but more so in the lower quadrants. There was some evidence of shifting dullness. No masses were felt, and peristalsis was diminished. A rectal examination revealed gross blood on the examining finger but was otherwise negative.

The temperature was 98.6°F., the pulse 76, and the respirations 20. The blood pressure was 120 systolic, 70 diastolic.

Examination of the blood revealed a red-cell count of 6,950,000, with 13.7 gm. of hemoglobin, and a white-cell count of 6850. The urine had a specific

*On leave of absence.

gravity of 1.020, with a + test for albumin and 2 to 3 white cells per high-power field in the sediment. The serum nonprotein nitrogen was 80 mg. per 100 cc., and the protein 7 gm. The serum chloride was 93 milliequiv. and the carbon dioxide content 32.4 milliequiv. per liter. The blood amylase was 30 units per 100 cc. The prothrombin time was 29 seconds (normal, 18 to 20 sec.).

A roentgenogram of the abdomen revealed distended loops of small intestine in the upper and middle portions of the abdomen. No definite air or fecal matter was seen in the colon.

Immediately following admission a Miller–Abbott tube was passed, but the tip never reached the duodenum. Ten per cent dextrose in water and 5 per cent dextrose in saline were administered intravenously, and the patient was given several transfusions and was placed in an oxygen tent. Peristalsis remained diminished or absent. On one occasion he passed 250 cc. of dark-red blood by rectum. The temperature ranged up to 100°F. Repeated roentgenograms of the abdomen revealed some increase in the number of dilated intestinal loops. With increasing hydration, however, the patient appeared to improve clinically.

On the seventh hospital day, an operation was performed.

Differential Diagnosis

Dr. Robert R. Linton: It is quite obvious that this patient presents a surgical abdomen, and it is my job to diagnose the cause of it. There are certain things in the history that I believe are of significance. The pain began in the midabdomen; at first it was nonradiating and apparently persistent, but later it became intermittent. Associated with the abdominal pain were nausea and vomiting, but it is not quite clear whether he vomited blood. It says "wine-colored fluid," and presumably there was some blood in the vomitus on the first occasion. Later he apparently did not vomit any blood. Another important fact is that he had passed bright-red blood by rectum before he came into the hospital and after he was admitted to the hospital, which to my mind means that he had some lesion of the gastrointestinal tract that was bleeding.

Of interest in his past history is the fact that one and a half years before admission a duodenal ulcer was shown by x-ray; this apparently responded well to medical treatment. At that time he also had a negative Graham test. Although I do not believe that too much emphasis should be placed on one negative Graham test, we can assume from these findings and history that the gall bladder was negative. He had had an appendectomy eleven years before admission.

The physical examination as written here is unrevealing. The only thing they tell us is that the abdomen was diffusely tender, no masses were felt, and peristalsis was diminished. Plain roentgenograms of the abdomen are, I believe, of considerable help and are something that ought to be routinely done in patients with obscure abdominal lesions, especially those who come in with a history of vomiting; I should like to see the x-ray films.

Dr. George W. Holmes: These films of the gastrointestinal tract show the characteristic appearance of small-bowel dilatation. In the early films, there is no gas in the rectum or any part of the large bowel, so far as I can make out. In the later ones, there may be a little, but the striking thing about them is the definite evidence of obstruction and small-bowel dilatation.

Dr. Linton: I agree with you that these are typical films of small-bowel obstruction. The obstruction was probably in the midportion of the small bowel, perhaps at the junction of the upper and middle thirds. The Miller–Abbott tube, as you can see, was coiled in the stomach; as so often happens with the Miller–Abbott tube when you want to get it through into the duodenum, it would not pass.

There are certain conditions that one must consider as the cause of this man's symptoms. In reading over the history, the first possibility that entered my mind was a severe gastritis, since he had vomited a small amount of blood and had passed a large amount by rectum. I think that it is possible for bright-red blood that has arisen from the stomach and duodenum to be observed by rectum. Such a condition, however, would not explain this man's condition.

Was he suffering from a bleeding duodenal ulcer? It is my opinion that the history of his having had an x-ray diagnosis of duodenal ulcer is more or less of a "red herring" and plays no part in his surgical condition on entry. It is perfectly possible that he had a duodenal ulcer with a small perforation that had sealed off and that he had paralytic ileus, producing the x-ray picture that you see; but if so, there should have been more evidence of peritonitis than was observed.

Could he have had an acute pancreatitis? That diagnosis probably was considered when the patient was admitted, since they did a blood amylase test, which was within normal limits. The dilatation of the small bowel and the fact that he passed blood by rectum are against the diagnosis of pancreatitis.

Another diagnosis to consider is volvulus of the small bowel, which had produced intestinal obstruction and had resulted in melena, nausea and vomiting. That diagnosis ought to be seriously considered, but in view of the low white-cell count, the chance that he had a volvulus of the small bowel is rather slight.

One thing that I did not quite understand in the laboratory examination was the red-cell count of 6,950,000, especially since on physical examination he was noted to be pale. I wonder if that reading is correct. It could possibly be explained on the

basis of dehydration, which he obviously exhibited when he came in.

DR. BENJAMIN CASTLEMAN: Four red-cell counts are recorded; they are 8.2, 6.9, 6.0 and 5.7 million, respectively.

DR. LINTON: That is interesting.

Could he have had an intussusception? That is extremely unlikely, since intussusception occurs rarely in this age group unless it is preceded by a lesion in the bowel.

Meckel's diverticulum is another condition that produces bleeding from the rectum; but, again, I think that that is rarely seen as late in life as at the age of fifty-five years.

Of course, a malignant neoplasm of the small bowel should be considered. I cannot see that he had any definite evidence of this, except that he had passed blood by rectum, meaning that he must have had an intestinal lesion, and that he had intestinal obstruction. Primary malignant tumors of the small bowel are relatively rare, but they do occur.

Mesenteric thrombosis, either arterial or venous in origin, should be seriously considered. The possibility of its being arterial in origin and having the man survive as long as he did without surgical interference is so remote that I believe it can be ruled out on the basis of the history. Mesenteric thrombosis of venous origin does not produce gangrene of the bowel so rapidly, although it may eventually go on to gangrene as the condition continues to spread and to involve more of the blood vessels of the small intestine.

In view of the fact that we are dealing with a man who had polycythemia and hence a tendency toward vascular thrombosis, it seems to me that the likeliest diagnosis is venous thrombosis of the mesenteric veins, resulting in secondary intestinal obstruction. I fully realize that he had a prothrombin time that was above normal, but I think that thrombosis can occur with an elevated prothrombin time.

DR. EMERSON DRAKE: I might say that about two hours after admission the patient vomited several cupfuls of bright-red blood; this added to the confusion of the picture.

CLINICAL DIAGNOSIS

Intussusception?
Carcinoma of colon, with extension to small bowel, producing small-bowel obstruction?

DR. LINTON'S DIAGNOSIS

Acute small-bowel obstruction, secondary to mesenteric-vein thrombosis.

ANATOMICAL DIAGNOSIS

Double ileoileal intussusception, with added intussusception into cecum.

PATHOLOGICAL DISCUSSION

DR. CASTLEMAN: At operation Dr. J. Gordon Scannell found a mass in the cecum that proved to be an intussusception of the ileum into the cecum. This intussusception was easily reduced, but that was not all. The part of the ileum that had intussuscepted into the cecum was itself the seat of two intussusceptions, which the surgeon was unable to reduce. When we received the specimen in the laboratory we pulled fairly hard and found an old ileoileal intussusception, which in turn had intussuscepted into a more distal segment of ileum. It was this double intussusception that in turn had formed the intussusception into the cecum, which was reduced at operation.

When the ileum was opened there was, of course, rather severe gangrene of the bowel, and within the first intussuscepted loop was the guilty leader — a submucosal lipoma, which was completely viable. Some of you may recall a case of ileoileal intussusception that we discussed here a month or so ago in which we were unable to find any tumor that might have led the intussusception.* At that time the suggestion was made that perhaps the gangrene had caused a sloughing off of the initial tumor, which might have been a polyp. Here is a case with three intussusceptions and still the polyp that led the tumor was viable.

CASE 31042

PRESENTATION OF CASE

A five-year-old boy was admitted to the hospital with headache, listlessness and fever.

Two months prior to admission the patient had a bad cold that was said to have been "almost pneumonia." This lasted about a week, following which he appeared to recover completely. Three weeks before entry he became tired and listless. Whereas he had normally been extremely active, he lost interest in play and eating. Ten days before admission he developed a fever of 102°F., accompanied by nausea and followed in a few days by frontal headache and persistent vomiting. There were no chills, convulsions or paralysis.

The developmental history was normal, and the past history was noncontributory.

Physical examination revealed a thin, poorly developed child responding clearly to questions but lapsing into drowsy stupor when undisturbed. The skin was clear and of good color. The ears and throat were negative. The fundi were normal. Small cervical lymph nodes were palpable bilaterally. The neck was stiff and painful on flexion. The heart and lungs were negative. The abdomen was soft, and there were no masses or tenderness. The

*Case records of the Massachusetts General Hospital (Case 31021). *New Eng. J. Med.* 232:49, 1945.

Kernig sign was doubtful. The deep tendon reflexes were active and equal.

The temperature was 99.4°F., the pulse 100, and the respirations 24. The blood pressure was 100 systolic, 75 diastolic.

Examination of the blood revealed a red-cell count of 5,220,000, with 108 per cent hemoglobin. The white-cell count ranged from 10,200 to 20,650, with 74 per cent neutrophils. The urine was essentially negative. A tuberculin test was negative in a dilution of 1:1000, but positive at 1:100. Blood cultures were repeatedly negative. A Hinton test was negative.

A roentgenogram of the chest revealed a slightly hazy left lung field but no areas of consolidation. There was no enlargement of the hilar nodes.

A lumbar puncture on admission revealed clear colorless fluid under a pressure equivalent to 250 mm. of water. The total white-cell count was 95, with 70 per cent polymorphonuclears. The total protein was 105 mg. per 100 cc., the gold-sol curve 0012333100, and the Wassermann test negative.

The temperature ranged between 100 and 102°F. Repeated lumbar punctures revealed pressures up to 550 mm., a fluid becoming opalescent and a cell count rising to 350. A sugar determination was 39 mg., and the chloride 567 mg. per 100 cc. Several spinal-fluid cultures were negative, as were smears for acid-fast bacilli. A throat culture revealed a Type 22 pneumococcus.

Sulfathiazole therapy was begun on the sixth day. On the eighth hospital day a neurologic examination revealed a patient difficult to arouse and with dilated pupils, fixed to light. There was no papilledema. The gaze wandered but tended to be directed toward the right. There was a left hemiparesis, with increased tendon reflexes and an extensor plantar response on the paretic side. There was a positive Kernig sign.

Death occurred on the tenth hospital day.

Differential Diagnosis

Dr. Allan M. Butler: From the information in the summary of this case, no definite diagnosis can be made. If a diagnosis of a fatal disease for which no therapy is available is made, one must be sure that all diseases for which medical or surgical treatment might be beneficial and in which the prognosis might be favorable are ruled out.

The sequence of respiratory infection, fatigue, listlessness, moderate fever, nausea, headache and persistent vomiting over more than a few days is consistent with the dissemination of a primary tuberculous focus and the development of tuberculous meningitis, but does not exclude influenzal meningitis, brain abscess or encephalitis.

On examination the mental state of the child and the stiff neck are consistent with a diagnosis of tuberculous meningitis. A positive tuberculin test in a child of five, and hence one who has had no contacts at school, suggests continued exposure at home or the ingestion of unpasteurized milk. In this connection, however, it might be remarked that resistance to tuberculosis is relatively good at five years of age and hence the incidence of tuberculous meningitis is markedly less at this age than at one, two or three years. The history as given unfortunately provides no information concerning the presence or absence of continued exposure.

The description of the roentgenogram of the chest is noncommittal. Dr. Castleman has informed me that the films are not available for re-examination here but that they were interpreted as essentially negative.

The spinal-fluid findings are not specific. Before discussing them I should like to ask Dr. Castleman if the patient was given parenteral glucose and if the serum chloride was determined at approximately the time of determining the spinal-fluid chloride.

Dr. Benjamin Castleman: Parenteral glucose was given during the period over which the spinal-fluid examinations were made. Sugar determinations on other specimens of spinal fluid were 63, 82 and 64 mg. per 100 cc. The level of serum chloride is not recorded.

Dr. Butler: This means that the spinal-fluid sugar of 39 mg. per 100 cc. and the other relatively normal spinal-fluid sugar levels do not rule out tuberculous or other bacterial infection. Without the hyperglycemia incident to the parenteral glucose they might have been markedly diminished. The lack of information about the serum chloride concentration deprives the low spinal-fluid chloride of diagnostic significance. The elevated spinal-fluid protein would in itself tend to depress the spinal-fluid chloride. Moreover, continuous vomiting may well have produced a low serum chloride level, which would also result in a low spinal-fluid chloride. The occurrence of 70 per cent polymorphonuclear cells is rare in tuberculous meningitis but not impossible; it is more consistent with a pyogenic infection.

The failure to identify organisms on smear is consistent with encephalitis, brain abscess or tuberculous meningitis. The influenza bacillus may also be missed. The failure to culture organisms is also nonspecific. No mention is made of a film or pellicle in the spinal fluid on standing. Moreover, nothing is said about looking for tubercle bacilli in the gastric juice. If the meningitis were due to a Type 22 pneumococcus, the spinal fluid would have been purulent and the organisms would have been seen or recovered on culture.

Sulfathiazole was not administered until the sixth hospital day. This means that such therapy did not interfere with culture of the spinal fluid. It also indicates that the diagnosis of tuberculous meningitis was not clearly established.

The progress of symptoms is not diagnostic. The repeated lumbar punctures may well explain the absence of papilledema.

The possible diagnoses appear to be tuberculous meningitis, with or without miliary tuberculosis, influenzal meningitis, encephalitis and, finally, brain abscess, although the absence of localizing procedures indicates that the attending physicians thought that this diagnosis was not possible.

I shall hazard the diagnosis of tuberculous meningitis, with or without miliary tuberculosis.

Clinical Diagnosis

Meningitis (? tuberculous).

Dr. Butler's Diagnoses

Tuberculous meningitis.
Miliary tuberculosis?

Anatomical Diagnoses

Tuberculous meningitis.
Miliary tuberculosis of lungs, liver, spleen, kidneys and bone marrow.

Pathological Discussion

Dr. Charles S. Kubik: Autopsy revealed tuberculous meningitis and miliary tuberculosis of the lungs, liver, spleen, kidneys and bone marrow. I should suppose that the listlessness, loss of interest in playing and loss of appetite noted three weeks before entry were the symptoms of more or less generalized miliary tuberculosis and that the onset of meningitis coincided with the development of headache and vomiting.

On examination of the brain the customary findings were observed. There was a subarachnoid exudate that was much more pronounced over the base of the brain and brain stem than elsewhere. Numerous tubercles of the arachnoid and pia could be seen with the naked eye and were later confirmed by microscopic examination. The lateral and third ventricles were enlarged to about four times normal size. The ependyma, particularly that of the third ventricle but also that of the lateral ventricles, was studded with tiny, barely visible tubercles that gave the ependymal surfaces a roughened appearance.

There was also a tubercle, 2 mm. in diameter, of the right cerebral peduncle, which may have accounted for the left hemiparesis. No other tubercles within the substance of the brain were found.

The bronchial lymph nodes were normal. The mesenteric lymph nodes were enlarged, but those examined microscopically showed no evidence of tuberculosis.

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"MIGHTIER THAN THE SWORD"

According to authentic information received by the Regional Office of Price Administration in Boston, hundreds of applications for extra food rations on medical grounds have been signed by physicians of this state, on the supposition that they would be turned down by the Medical Advisory Committee, actuated by more patriotic motives than can be attributed to the original signers. We trust that, although many such applications have repeatedly been filed, the actual number of physicians lending their names to such practices is not large.

One explanation given for this casual attitude toward signed statements is that they were not "sworn to." Fortunately the majority of physicians still honor their own signatures, considering their word as good as their bond. Probably even physicians who sign false food applications would hardly consider it necessary to appear before a notary in order that a signed letter might be supposed to contain the truth, nor would they think that their checks should be certified before being honored. We are, on the whole, accepted at our own valuation until new evidence indicates the need for a reappraisal.

Rationing of the necessities of life in the critical years through which we are passing is a bitter reality that comes hard to a self-willed and indulgent people, a people who have yet to learn whether it really merits the freedom that is supposed to be the reward of victory. Special confidence has long been placed in the physician, who has held a place in our social and economic structure that would hardly be conceded to a mere vendor of nostrums or a peddler of pills. Paid or unpaid, he is, as Wendell Berge* recently indicated, a particularly esteemed public servant. The public and the nation have a right to expect that he guarantees the honesty of any document to which he affixes his name.

MEDICAL PREDICTIONS

In two previous editorials[1, 2] the *Journal* expressed disapproval of the policy of the *Reader's Digest* in publishing articles[3, 4] that tend to misinform and mislead the public. Those opinions still stand for implications made in an article, entitled "Atabrine Fully Vindicated: Malaria, scourge of mankind, *can* be licked," appearing in the December, 1944, issue of the same periodical.

Incidentally, the current article indicates that the author has now learned that mosquito control is a major part of malaria control. Furthermore, it contains scientific evidence for his previous predictions. The major part of this evidence, however, has accumulated since 1942 through the combined labors of medical officers in the armed forces and the concentrated research of pharmacologists and malariologists. Fortunately, these medical men and scientists did not spend their time in making armchair predictions of things to come.

*Berge, W. Justice and future of medicine. *New Eng. J. Med.* 231: 721–729, 1944.

Although the great amount of field and laboratory experience gathered in the last two years has taught us how to use atabrine safely and more effectively, the fact still remains that this drug will not prevent infections, effect radical cures or prevent relapses in a certain percentage of men infected with tertian malaria. One cannot help but wonder what the men in the armed forces who contracted relapsing tertian malaria in the South Pacific and the medical officers who treat them have to say about the curability of malaria. Since tertian malaria produces the bulk of morbidity among people in endemic areas, the validity of the statement that "malaria *can* be licked" by atabrine, or by any other known drug, does not stand up to critical examination.

Endemic areas of malaria will continue to exist just so long as relapses occur to provide a seed bed of gametocytes for local anopheline mosquitoes to transmit the infection to a healthy person. Since the use of known drugs cannot prevent relapses and since modern mosquito control cannot entirely eliminate the anopheline vectors, the possibility of malaria epidemics persists. Furthermore, the elimination of malaria from the world, unfortunately, is not dependent on the cost of a dose of an antimalarial drug, of a mosquito repellent or of a lethal insecticide. The problems of malaria, venereal disease, respiratory disease and malnutrition, to mention a few of the significant menaces to public health, are firmly linked with the economic and intellectual welfare of the people.

Finally, the article under discussion criticizes the National Research Council and its committees for lack of faith in atabrine early in the war. It should be pointed out that the function of a group of medical advisers is not idly to predict that this or that drug will eradicate this or that disease. Their responsibility is to protect and save the lives of people on the basis of their judgment in obtaining and evaluating evidence for or against the use of a drug, serum or vaccine, a method of treatment or a surgical operation. Lives of people — our boys — are at stake, not merely the circulation of a magazine.

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2. Editorial. Eradication of malaria. *New Eng. J. Med.* 228:34, 1942.
3. de Kruif, P. Found: one-day cure for syphilis. *Reader's Digest*, September, 1942.
4. *Idem.* Enter atabrine — exit malaria. *Reader's Digest*, December, 1942.

MASSACHUSETTS MEDICAL SOCIETY

EXECUTIVE COMMITTEE OF THE COUNCIL

On December 27, 1944, the Executive Committee of the Council, on the recommendation of the Committee on Membership and representatives from the supervising censors, took the following actions:

Allowed the following named fellows, applying for retirement and with all dues paid and in good standing, to retire under the provisions of Chapter I, Section 5, of the by-laws, such retirement to be effective as of January 1, 1945:

Alley, Ernest J. (Middlesex North), Billerica.
Estabrook, Charles T. (Worcester), 10 Algonquin Road, Worcester.
Painter, Charles F. (Norfolk), 520 Commonwealth Avenue, Boston.
Pease, Lewis W. (Norfolk South), 135 Webb Street, Weymouth.

Allowed the following named fellow, applying for retirement, to retire with remission of dues owed the Society under the provisions of Chapter I, Section 5, of the by-laws, such retirement to be effective as of January 1, 1945:

Miller, Samuel O. (Hampden), 73 Ellsworth Avenue, Springfield.

Reinstated the following named physicians, who had resigned from the Society while in good standing, under the provisions of the by-laws, Chapter I, Section 10:

Hatt, Ednah S. (Hampden), 720 Longmeadow Street, Longmeadow.
Woodman, Alice J. Hopkins (Plymouth), Standish Street, South Duxbury.

Reinstated the following named physicians, under the provisions of Chapter I, Section 10, of the by-laws, who had been deprived of fellowship for the nonpayment of dues, provided their arrears in dues at the time they were dropped plus the dues for 1945 be paid to the treasurer of the Society:

Canzanelli, P. (Middlesex South), 300 Mt. Auburn Street, Watertown.
Ginsberg, Max (Essex South), 70 Washington Street, Salem.
Healy, John F. (Norfolk), 374 Dudley Street, Roxbury.
LeBeau, Raoul J. (Worcester), 154 Main Street, Spencer.
Manoogian, B. J. (Essex South), 5 Holten Street, Peabody.

Remitted the dues owed the Society of the following named fellows, who are ill and incapacitated, under the provisions of Chapter I, Section 6, of the by-laws:

Keay, Harry C. (Worcester), Clinton Road, Sterling. 1942, 1943 and 1944.
Sweeney, William J. (Middlesex East), 4 Avon Street, Wakefield. 1944.

Allowed the following named fellows to change their membership from one district society to another, without change of legal residence, under the provisions of the by-laws, Chapter III, Section 3.

Butler, Allan M., Massachusetts General Hospital, Boston (Norfolk to Suffolk).
Park, Francis E., 172 Commonwealth Avenue, Boston (Middlesex South to Middlesex East).
Quinby, John T., 226 Marlboro Street, Boston (Norfolk to Suffolk).

The personnel of the Committee on Membership is as follows: Harlan F. Newton, *chairman*; John E. Fish, Peirce H. Leavitt, Sumner H. Remick and Samuel N. Vose. The representatives of the supervising censors are as follows: William H. Allen, H. Quimby Gallupe and Albert E. Parkhurst.

MICHAEL A. TIGHE, M.D., *Secretary*
Executive Committee

DEATH

SISKIND — Alexander L. Siskind, M.D., of Lawrence, died May 5. He was in his seventy-eighth year.

Dr. Siskind received his degree from the College of Physicians and Surgeons, Boston, in 1890.

WAR ACTIVITIES

INDUSTRIAL HYGIENE

SICK ABSENTEEISM AND MEDICAL CERTIFICATES FOR INDUSTRIAL WORKERS

The present critical need of manpower for increased war production calls for more effort to be directed toward reduction of unnecessary absenteeism and labor turnover. Among the many factors bearing on this problem is the relation between private physicians and industrial physicians. A statement recently prepared on this subject by the Safety and Security Division, Office of the Chief of Ordnance, Army Service Forces, directed toward industrial physicians in ordnance plants, has been called to our attention because of its applicability to all plant physicians and co-operating private physicians.

This statement says, in part: "To minimize absenteeism alleged to sickness and terminations attributed to ill health, the closest possible co-operation should be maintained between plant physicians and private physicians in nearby communities. Private physicians often have no accurate information concerning health hazards associated with their patients' jobs in ordnance plants and the generally satisfactory medical and engineering measures taken for their control, and are often at a loss as to how to advise their patients regarding complaints related to work. Likewise, private physicians are not generally aware of the information concerning their patients, available from the plant physician in connection with past examinations, blood tests, x-ray findings and other diagnostic aids."

The related problem of medical certification of illness has also been brought to our attention as a matter that should be considered by the state industrial-hygiene divisions. This subject was discussed in an editorial entitled, "Medical Certificates and War Production," published in the *Journal of the American Medical Association*, issue of November 11, 1944. The private physician's responsibility is presented in this editorial as follows: "The Government and its contracting agents customarily require medical certificates to cover an absenteeism alleged to illness or a labor termination attributed to reasons of health. The medical profession is then put under pressure by thoughtless persons who see little harm in collecting disability benefits or in obtaining better jobs on pretext of illness. They fail to see the cumulative results of hundreds of thousands of such acts on critical war production. Responsibility rests squarely on the physician to act as prosecutor, defense attorney and judge before issuing such a certificate. He fails himself, his profession and the war effort if certificates are issued without due cause."

Traditionally, the doctor has been called on to champion and to be an advocate of his patient. In the main, the patient has been the one who employed him and he has instinctively defended the patient against any or all groups having impersonal interests. The doctor is called on to certify to this and to that. He must certify birth and death; the occurrence of contagious disease; the health of food handlers; and the freedom from disease of candidates for marriage. Health and accident policies depend to an appreciable extent on the knowledge and integrity of practicing physicians. Compensation statutes require medical judgments as bases to support legal judgments. One easily understands why the busy doctor labels all certification a "chore." It is true that to refuse to sign any statement his patient requests, the physician risks an irate individual, but one wonders what degree of confidence and respect the patient will have in his doctor if the latter, unwittingly or not, falls in with such a procedure to circumvent common honesty.

The tendency of some workers is to indict fumes, gases, dust and so forth for real or alleged ill health. Actually, few unskilled workers know what if any occupational hazards exist in their working environment. Such a worker, in the role of a patient, may influence the family doctor to a most astounding and untenable diagnosis. It seems opportune to urge that physicians protect themselves in this respect by using confirmatory sources of information.

State and local industrial-hygiene divisions can give the private physician information on the specific environmental health conditions in a particular plant on request, when there is any question concerning the possibility of illness being incurred on the job. They can also assist industries in developing a standard form of certificate for physicians to use in making reports and can bring this subject to the attention of medical societies as opportunity offers. Reprinted from *Industrial Hygiene News Letter* (December, 1944).

NOTICES

BOSTON GASTROENTEROLOGICAL SOCIETY

The next meeting of the Boston Gastroenterological Society will be held in the Thorndike Amphitheater of the Boston City Hospital, on Wednesday, January 31, at 12:00 m. Dr. George W. Harley will discuss "Twenty Years of Tropical Medicine in Liberia."

NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

The monthly clinical conference and meeting of the staff of the New England Hospital for Women and Children will be held on Thursday, February 1, at 7:15 p.m. in the classroom of the nurses' residence. Dr. Pauline Luzackas will speak on the subject "Torticollis."

NEW YORK INSTITUTE OF CLINICAL ORAL PATHOLOGY

The New York Institute of Clinical Oral Pathology will hold its one hundredth monthly conference at the New York Academy of Medicine on Monday evening, April 30. Members of the medical and dental professions will discuss the subject "A Survey of the Antibiotic Problem," both from the theoretical and from the clinical standpoints.

Members of medical, dental, public-health and other professional groups are cordially invited. For further information all communications should be addressed to G. Roistacher, Executive Secretary, 101 East 79th Street, New York 21, New York.

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